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Watershed and Fish Habitat Degradat...

WATERSHED AND FISH HABITAT DEGRADATION

HEARING

BEFORE THE

SUBCOMMITTEE ON
NATIONAL PARKS, FORESTS, AND PUBLIC LANDS

OF THE

COMMITTEE ON
NATURAL RESOURCES
HOUSE OF REPRESENTATIVES

ONE HUNDRED THIRD CONGRESS

FIRST SESSION

ON

WATERSHED AND FISH HABITAT DEGRADATION ON PUBLIC LANDS AND NATIONAL FORESTS IN THE PACIFIC NORTHWEST

HEARING HELD IN WASHINGTON, DC
MARCH 11, 1993

Serial No. 103–10

Printed for the use of the Committee on Natural Resources

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WATERSHED AND FISH HABITAT DEGRADATION ON PUBLIC LANDS AND NATIONAL FORESTS IN THE PACIFIC NORTHWEST

THURSDAY, MARCH 11, 1993

HOUSE OF REPRESENTATIVES, COMMITTEE ON NATURAL RESOURCES, SUBCOMMITTEE ON NATIONAL PARKS, FORESTS AND PUBLIC LANDS,

Washington, DC.

The subcommittee met, pursuant to call, at 10 a.m. in room 2253, Rayburn House Office Building, Hon. Bruce F. Vento (chairman of the subcommittee) presiding.

OPENING STATEMENT OF CHAIRMAN VENTO

Mr. VENTO. The meeting will come to order. We have tight quarters here. In fact these days it is hard to get rooms to hold our hearings. I think as a committee we came up short in terms of rooms, but I guess we have an historically preserved room.

In any case, we have an ambitious agenda this morning and into the afternoon with a series of votes scheduled on the Floor, and I'm sure other Members have business as I do. So we will try to make it a successful hearing in terms of listening to our witnesses and maybe getting some dialogue on this important topic.

Yesterday, of course, the President began the season on the topic of problems in the Pacific Northwest by keeping his commitment to hold a forest summit in early April. So we look forward to that, to the administration's positive involvement in bringing together all the resources of the national government, all the agencies and departments into a coherent policy dealing with the series of problems with the temporate rain forests of the Pacific Northwest.

Today, of course, we're focusing on one important aspect of that in terms of the land management and the impact on the fisheries in the Pacific Northwest.

The American people have a spectacular natural resource, the salmon and steelhead runs that extend from the Pacific to central Idaho. Two summers ago I stood on the banks of a small stream in the Chamberlain Basin, in the heart of Idaho's Frank Church-River of No Return wilderness and watched a Chinook king salmon, a beat-up fish, that had traveled almost a thousand miles from the ocean to return to it is birthplace to spawn. I felt a sense of awe, as I'm sure most of you would standing in my shoes, witnessing this phenomenon, because this salmon was one of only a few left in a salmon run that some time ago numbered in the thou-

sands. If we were to go back to that same spot this summer we may not see any salmon at all.

The fact is that the Pacific Northwest is losing forever the salmon and steelhead populations. Races of fish varieties, in scientific terms, are being lost forever. Four populations of salmonids are already listed under the Endangered Species Act; 214 populations are considered at risk of extinction and may soon be listed. Steps must be taken now to prevent the wholesale loss of this priceless fishery. Not only are our anadromous fish valuable as part of the Nation's biological diversity and gene pool, but these salmon are a big contributor to the economy of the region.

In the Pacific Northwest, the salmon fishery generates $1 billion in annual income and 60,000 jobs. This is a renewable resource every year and is better than money in the bank.

What is causing this tragedy? Some blame the dams and water projects in the Columbia River system, which certainly are a significant factor. However, many of the salmon and steelhead runs identified by scientists as at risk are found in river systems outside of the Columbia Basin, river systems which have no dams at all. Other factors besides water projects are apparently contributing to the decline.

This hearing will focus on just such other factors, pointedly the destruction and modification of salmon habitat. Without high quality fish spawning and rearing habitat, the remaining populations of salmon and steelhead are simply doomed to extinction. The last high quality, undergraded habitat remaining in the Pacific Northwest is on lands managed by the Forest Service and the Bureau of Land Management. These two agencies have the potential to play a major role in saving salmon and steelhead for future generations of Americans.

Unfortunately, the Forest Service and BLM have not lived up to such a role. In fact, their past and current policies and programs are contributing on a documented basis to the destruction of habitat for salmonid populations. Logging, road building, and livestock grazing in watersheds critical to the survival of salmon and steelhead are causing erosion and sedimentation to degrade spawning and rearing habitat. Not only must these practices be arrested and/or stopped, but the Forest Service and the Bureau of Land Management must launch new programs to stabilize and restore the watersheds under their stewardship. As their timber program in the Pacific Northwest declines, these two agencies could refocus and give new emphasis to recreation, wilderness, wildlife and fish. For every timber job impacted, both within the agencies and in the private sector, the Forest Service and BLM could employ workers to rehabilitate, restore, and enhance in an environmentally positive way our national forests and public domain lands. Studies, in fact, show that 11,000 people annually could be put to work just on stabilizing watersheds key to the survival of salmon and steelhead, supporting the 60,000 jobs and $1 billion fishery base of the Pacific Northwest.

I look forward to hearing from our witnesses on how the Forest Service and BLM can protect watersheds and fish.

As their timber programs in the Pacific Northwest decline, these two agencies could refocus and give new emphasis to recreation

wilderness, wildlife and fish. For every timber job impacted, both within the agencies and in the private sector, the Forest Service and BLM could employ workers to rehabilitate, restore, and enhance in an environmentally positive way our national forests and public domain lands.

Studies show that 11,000 people annually could be put to work just on stabilized watersheds, key to the survival of the salmon and the steelhead, supporting the 60,000 jobs and the $1 billion fishery base in the Pacific Northwest. So I think this is a prudent way to move.

I must say that as we gain more insight into these problems and the scientific data which support them, obviously it is of paramount importance that we make the changes in our land management plans to reflect that knowledge and to set new goals and a policy path which will, of course, attain the goals and concur or follow the laws and policies that we have, such as the Endangered Species Act.

So I think that while we may talk about Forest Service and BLM and public land management problems in the past, today we have the information, and I think it is imperative that we move and craft policy and land management plans on that basis.

The gentleman from Idaho—from Utah.

Mr. HANSEN. That was George Hansen. I am not related in any way shape or form. And I have a great appreciation for George.

Thank you, Mr. Chairman, the gentleman from Wisconsin. It is nice to be——

Chairman VENTO. We have always wanted a piece of Wisconsin.

Mr. HANSEN. We always wanted a piece of Idaho, too, and Arizona if I may be picky about it.

STATEMENT OF HON. JAMES V. HANSEN, A U.S. REPRESENTATIVE FROM THE STATE OF UTAH

Mr. HANSEN. I don't know how to respond to this. This is age-old stuff we have gone through so many times on this committee. We are here to review one species versus something else. When you get into this thing, you can accept a lot of premises. It is like going to court and listening to people testify about what this witness is like. Is it a malingerer or somebody trying to build an unfair case? You wonder who is really right.

I am sure today we will hear testimony that will say that it is the logging, that they caused the whole thing; and another person will say it is the construction of dams; another person will say it is the drought; and another person will probably say it is overfished; and another person will say it is hatchery fish versus the other one. And it is hard to figure out who is really right in these particular situations of who does these things.

I would hope that the subcommittee is a little hesitant and not in a big hurry to start placing blame and pointing fingers. That probably wouldn't answer the question adequately and sincerely and honestly. I think we have a habit of reacting to things when sometimes we are not sure what the problem is that is facing us.

I look forward to the hearings because similar situations are happening all over the United States. I think we have to move with

some restraint on a very positive thing with a lot of information before we go out and mess something up.

I recall when I was speaker of the Utah house and the Governor of the State was a man by the name of Scott Mathison. And he came up and said, I'd like you guys to pass a law that we don't allow any more eggheads from the academic community to come in here and tell us what is an endangered species, because they are ruining a part of our State; and I think they are wrong, and it is so easy to get them listed and hard to get them off.

I worry about the endangered species law. We have seen very little that have gotten off the list. No disrespect to any particular entity here. I would hope that we move with a sensitive approach and not be eager to point a finger and say that they are wrong, and do something that would ruin an industry.

Prices of houses are going up $3,000 to $4,000 a house because of the lumber prices. In the little State of Utah we have Kaibab Industries in the Dixie Forest that have closed up. Every time they ask for a contract, some environmental group comes up with a 29-cent appeal. All it costs is a stamp on an envelope and something written on the back of it. And I think if we are going to look at something, we ought to look at that.

Thank you for allowing me to vent my emotions on that.

Mr. VENTO. The way you were going, I thought you were going to blame the fishermen.

Any other opening comments?

STATEMENT OF HON. KEN CALVERT, A U.S. REPRESENTATIVE FROM THE STATE OF CALIFORNIA

Mr. CALVERT. The issue which we are meeting today is a complex one, and in the best economic times, it would be difficult to balance the interests of salmon fishermen, home builders, home buyers, the spotted owl and numerous fish species. With the economy in the shape that it is, the issue becomes even more difficult.

As a congressman from California whose district has nearly 10 percent unemployment, I must confess that my sympathies are with those people who need jobs. While I recognize the importance of protecting species, I hope we can find ways of doing it without throwing hundreds of thousands of workers out of work.

I certainly have no objections to reviewing past management practices of any type. The management of every Federal agency and committee, in my opinion, could stand a good review; but I hope those from whom we will hear today will include, along with their ideas of protecting the salmon, some ideas of how to protect and create jobs for the American worker. As an elected representative of the people, I believe we have an obligation to protect jobs as well as species of fish.

Mr. VENTO. We are pleased to welcome our colleague from Washington, a good friend and classmate of the chairman, Congressman Norm Dicks.

STATEMENT OF HON. NORMAN D. DICKS, A U.S. REPRESENTATIVE FROM THE STATE OF WASHINGTON

Mr. DICKS. Thank you, Mr. Chairman. I appreciate the opportunity to be here, and I will start on my testimony and I will try to be brief.

Mr. Chairman, and Members of the subcommittee, I greatly appreciate the opportunity to appear before you this morning to present my perspective on the subject of watershed restoration and the protection of salmon habitat, specifically, as these matters are relevant to the lands in the Pacific Northwest.

We have large areas of Forest Service lands in Washington, and large areas of Forest Service-BLM land in Washington. I believe that the issue being addressed today is important, critical, and timely; and I am supportive of all credible actions that can be taken to get ahead of the curve on these concerns.

As you know, I am a Member of the Appropriations Subcommittee which shares oversight with this committee. I believe that if we work together creatively with the new administration in identifying opportunities to deal with the problems, progress can be made sooner rather than later in reversing the damage on the ground and restoring ecological integrity of the watershed.

I am encouraged by the attitude of the new administration in being willing to place on the front burner issues like habitat restoration. I have had the opportunity to speak to President Clinton and Vice President Gore and Secretary Babbitt, and I am impressed with their commitment to work with the Congress and concerned citizen organizations to take appropriate responsible action. I recognize the urgency to move forward with an action agenda for a rehabilitation-oriented initiative, and I have been a long-time supporter of on-the-ground approaches to solving the environmental problems of the Northwest.

I would like to add that my new congressional district, which is dominated by Washington State's Olympic Peninsula, is an area in great need of qualitative on-the-ground responses to its ecological problems. The more that I have been able to be briefed on these matters by scientific experts, by Federal and State natural resource experts, and to conduct both aerial tours and site visits to damaged riparian areas along river corridors, the more I believe that we can take positive action and produce a coordinated, scientifically credible approach to rehabilitating our streams, rivers, and watershed ecosystems on the Olympic Peninsula in the Northwest.

I emphasize an on-the-ground response because that is where true success must ultimately be measured. I believe that we have to start reversing the damage and getting ahead of the problem. We need to prevent damage to our remaining salmon habitat. This is why I was pleased to include $1 million in the fiscal year 1993 Interior appropriations bill to begin watershed restoration and streambed rehabilitation activities on the Olympic National Forest. This was obviously an initial but necessary investment, and I am hopeful that moneys identified through the President's economic stimulus package will accelerate the work that has begun on the peninsula. And I am pleased that Secretaries Espy and Babbitt have been supportive.

I would add, Mr. Chairman, in regard to the Olympic Peninsula, that one of the challenges that we face in providing for a comprehensive response to damaged watersheds, is that the peninsula has multiple owners so that a river may begin in the mountains in the Olympic National Park, then route through lands managed by the State's Department of Natural Resources and private sector entities that own forests up to the Straits of Juan de Fuca or the Pacific Ocean, including a number of our Indian tribes.

To get at the problem, I endorse an approach which focuses restoration efforts on public lands, but which encourages cooperation with land managers while providing incentives that allow private sector participation. This is what I feel is truly needed on the Olympic Peninsula that provides a response to watershed restoration. This is a perfect test case in the Northwest to demonstrate streambed rehabilitation.

A major benefit for the Northwest region in initiating and implementing a comprehensive strategy for streambed rehabilitation and watershed restoration is that salmon habitat will be better protected and stored.

As I know this committee is fully aware of, we face a critical situation in the region with depleting wild salmon populations, and this requires an aggressive and effective response. There are complex and difficult to quantify reasons for the decline in salmon runs in the region. There is no one source of the problem, no one contributor. More importantly, there is no rational value in playing the blame game, as we have done on Superfund. Who did it is not the problem that we face. What do we do about the problem and how do we get started? These are the critical questions and where the real focus should be.

One of the really positive aspects about taking action in the region is that watershed restoration efforts help prevent additional endangered listings of salmon species. If we can prevent this by taking appropriate action, it should be a goal that is pursued without delay. And by the way, such a conservation plan would allow the agencies, if they are in place to say, this is a credible plan, this is the best we can do; and not feel constrained to list additional species.

One other additional aspect that I endorse is focusing first on protecting the healthiest salmon habitat. This is a position that the Pacific Rivers Council will present today. But what is most significant about what they will say is that this conclusion is one that has undergone scientific peer review, and the science seems to argue for a focus on the healthiest habitat. This would have the effect of applying a tourniquet to the problem. We do not need a Band-Aid approach to the problem. We need innovative solutions that work for the long term. And this is where I hope that the agencies, the resource agencies—Forest Service, BLM, Fish and Wildlife Service—will consult with people who have been out there in the field, who have done this already, rather than trying to create their own programs kind of in a vacuum, because I am fearful that what we will get out of that, say, Band-Aid approach is not what we need.

Yesterday, President Clinton announced plans to convene a forestry conference in the Northwest region on April 2 with the Vice

President and key Cabinet positions attending. We look to the forestry conference with optimism and hope, and see it as an opportunity to define both the problems and solutions related to forestry management on the Federal lands in the region.

My hope is that the President's summit in the region and subsequent action by the Congress will lead to an ecosystems management approach that will be regionwide in application. A watershed restoration strategy is an important link to such an approach, ensuring the restoration of habitat that would have a multispecies benefit.

In addition to the clear ecological benefits of habitat restoration and ensuring the viability of salmon populations, I am pleased that the initiation of comprehensive watershed restoration strategy will create jobs in the region—that is what we need—and in rural timber-dependent communities. It is important to emphasize that these jobs will concentrate on fixing roads and involve the use of heavy equipment.

The Pacific Rivers Council will testify this morning that between 7,000 to 11,000 good wage-paying jobs could be created in the Northwest if this gets moving, and I ask the committee to give full consideration to their arguments. A main point that the rivers council will argue, and I agree with, is that we should take a serious look at the watershed initiative from the standpoint that it is both job creating and ecologically rehabilitating.

Finally, let me say that to make a regionwide watershed restoration project work, and to tie it into a meaningful ecosystems management strategy, there has to be credible leadership from the administration. And from my experience so far, I believe that this is going to be the case with the President and his team. I expect this administration to address forest management concerns through a coordinated strategy in which watershed restoration is a component. We know that this kind of effort can be done on the ground with real results, as has already been demonstrated in northern California and eastern Oregon.

I look forward to working with you, Mr. Chairman, as one of the really outstanding leaders on these kinds of issues in the Congress. With this commitment to helping ensure that this initiative gets started in a comprehensive and effective manner, we need your help.

Mr. VENTO. Thanks, Norm, for an excellent statement.

Without objection, all of the statements of witnesses' and Members' opening statements, in their entirety, will be made a part of the record. Hearing no objection, so ordered.

It is a positive statement and I think indicative of the tremendous work that you have done, I think, in the past years with regard to these Pacific Northwest forests. I observed myself early on—and I think others perceived the same—that there was a forest full of problems under the spotted owl. I think we are beginning to see that now, and I think your embrace and articulation of an ecosystem approach is important.

These are complex issues that need to be addressed in terms of water quality. I think the Olympic Peninsula has very few water projects; is that correct?

Mr. DICKS. There are very few water projects; we have one on the Elwha and one on the Skokomish River.

Mr. VENTO. That is on a resolution path, but there are very few water projects per se.

Mr. DICKS. The problem has been the effects of growth. In the Puget Sound area we have lost 90 percent of our habitat because of the great population growth we have had. Some of it has been because of developments; some of it has been because of harvest practices, road construction. And that is why I don't think it does us any good to waste our time pointing the finger.

What we should be here to do today is to try to figure out a constructive way to move ahead. And I see this as part of the solution in the timber summit, in the forestry conference. This can be a way to provide jobs and restore habitat and avoid future listings. We have all got a stake in that.

I looked at the list of the potential species in California. I mean, if we don't get ahead of the curve on these things, we are going to stop America. I mean, literally, we have got to take a kind of a statewide look at habitat. We have got to do a better job of protecting habitat so that we can avoid these listings. Believe me, I want to avoid them if possible.

And I see this approach as trying to get ahead of the curve and being a credible approach. It will also help the salmon, which is crucially important to the people of the Northwest.

Mr. VENTO. I think it is good to find a magic bullet. With the eagle, it was DDT. But in this case we are looking at a number of factors that are impacting, and some of these we control. The only reason we are talking to the Forest Service and the BLM is because they have the lands that remain that have the most significant salmon populations, the ones that you point out that we could do something to put a tourniquet on to stop the hemorrhaging.

I think the point made with regard to the mixture of lands, not just the BLM that has the mosaic pattern, but in the Olympic Peninsula, that we need to have a program for the agencies if they are going to take or build or coordinate with the States or others that already have taken action for salmon restoration.

I know that in Washington State the salmon restoration projects have been participated in where elementary schools have adopted streams.

Mr. DICKS. This has been a really grassroots type of thing.

Mr. VENTO. Nothing new for the elementary students, but I would hope that some of us inside the Beltway could recognize the particular problem and what needs to be done.

Mr. DICKS. Sometimes it is simple things. People will argue that in the old days we used to take all the trees out of the streams. Now if you listen to the experts, they say we need the downed trees in the pool to stop the gravel, and that helps the entire ecology of the area.

There are some of these things that can be done without massive expenditures of money that will really help restore habitat, and that is what we are talking about. We have lost our habitat for fish and we have problems in the ocean with drift nets and intercepts in Canada, et cetera. But if we don't do some things now, I am

fearful that this could put us in a dangerous decline. And we've really got to step up this.

Mr. VENTO. Let me yield to my colleague.

Mr. HANSEN. Thank you. I appreciate that. I think as usual, Norm Dicks gave an excellent statement, right to the point. I agree with your premisses and what you have come up with, especially when you talk about avoiding the listing. I think most of us would like to avoid a listing like the plague in many areas, but it is so easy to list. I think if we have any argument with the Endangered Species Act, it would be the point that listing is relatively easy. I don't see anything sacred in the Endangered Species Act.

We go back and look at it again and again and again and try to purify and perfect laws. I think we would be wise to take a look at the listing of the Endangered Species Act and take the word "solely" out. I think that would be a word that would be prudent for everyone.

We could look at other factors of the species in question. I think if would make it more palatable and one that, as you stated, wouldn't close up America, the way it is going now, if we continue to put these things on one after the other. And some rely on sketchy and questionable biological information. I am urging my people to go to court. If that is the way it is, challenge these people.

Secretary Babbitt is coming up to talk about the Mexican spotted owl in Utah, Arizona and others; and the stuff is so sketchy, I have put people out to see if they could find it. They found two. The rest is circumstantial evidence that couldn't be introduced into a court. I think that it would be prudent for Congress to take a look at the act and make it better than it is.

Mr. DICKS. My view is, a species-by-species approach will not work. What we are trying to do in the Northwest is take western Washington, western Oregon, northern California and take an ecosystems approach. Let's deal with the owl, the murrlet, the plover, and the salmon; and we want to do it once, comprehensively.

We want to have a good, credible plan for habitat protection. And then we want to legislate. And that's it. And that seems to me to be the approach. Then we could revisit it.

The failure here is that we wait until the species is in trouble before we take action. And, frankly, what we need to do, I think, is every State needs to get all of its people together, its resource people—and we have some State borders—and work out a plan. And then you take it to the Fish and Wildlife Service and say, here is our plan. We have looked at economics, science, and everything, and this is the plan that we think gives us a chance to protect a cross-section of the species with a goal of biodiversity, and we want this problem certified so that we don't have to go through this species-by-species problem.

And we have to be affirmative about that, and once you have done that, you are certified, and you review it every five years and see if some changes need to be made.

First of all, a species-by-species approach will never work because there are too many of them and you don't have enough governmental officials to handle them all and you wait until things are in trouble.

Mr. HANSEN. I would agree with that, and I think what you are saying is reasonable; but the premise that you have put on the table doesn't square with the law that we have now on the books.

Mr. DICKS. When we do the reauthorizations of the Endangered Species Act, we are going to have to look at a new strategy, an ecosystem strategy, some have characterized it, or you do a state-by-state habitat plan. I think that is what we would rather do in Washington.

Mr. HANSEN. That is excellent testimony. I couldn't agree more. I think that idea ought to come forth—we ought to do that because it sure isn't working the way it is going.

Mr. VENTO. Other questions?

Mr. Dickey.

Mr. DICKEY. What is the summit? What is the form——

Mr. DICKS. We are calling it a conference now.

Mr. DICKEY. What is the conference format? Do you know?

Mr. DICKS. I think what is going to happen is that the President and Vice President and Secretaries are going to work up panels of very constructive witnesses, like they did at Little Rock in the Economic Summit, where they come in and lay out the problems, the concerns, and the issues so that the administration can be better informed, and then——

Mr. DICKEY. Are you going to do that?

Mr. DICKS. It is going to be on April 2, and we are going to be in session on that day. We are working with the administration on that, and we are discussing how to work around that. We have already had a chance to sit down. I have had three chances to sit down with the President and Vice President Gore, so there is plenty of input.

What we want this to be is a chance for the people of the Northwest to talk directly to the leaders of this administration. Where we got into trouble, the last administration let the BLM go one way, the Forest Service go another way. The White House was going another way; the Fish and Wildlife was going four different ways, and we never had a comprehensive plan to deal with the problem.

That is what we need now and that is what they have pledged to us, an interagency approach. And then I think we are going to have to legislate it. But ultimately, the summit, like the Economic Summit, is a chance to have input; and then the administration and the Congress is going to have to come up with a plan.

Mr. DICKEY. Good statement.

Mr. CALVERT. I was very interested in your testimony regarding species-by-species approaches presently being taken by the Fish and Wildlife Service. I concur. I am from Riverside, California. We have a problem with the Stevenson rat.

Mr. DICKS. We did this. Congress did this. I can't blame the Fish and Wildlife Service.

Mr. CALVERT. We have the black-tailed ratcatcher, which may have a major impact on our area. We are putting together a multihabitat plan now. We have it together.

I can understand your frustration in that we can't transfer moneys from one place to buy additional habitat, under the existing

law. So if we could work toward prelisting and working with other agencies, where we have a flexibility——

Mr. DICKS. Or prevent listing.

Mr. CALVERT. When I say prelist, I would hope that it would never make the list; but species that are threatened at the present time, that we could talk about shared habitat planning, and working towards assuring that those species never make the endangered species list. And I would hope that we could work toward that and work with the local agencies. We sometimes are better able to coordinate species protection.

Mr. DICKS. We have started a little program in Washington called the Washington State Ecosystems Project, which is being coordinated by the Fish and Wildlife Service and our State department of wildlife. We are going out and restoring habitat, buying habitat, leasing habitat, getting farmers to voluntarily contribute habitat; and I think we have restored 270,000 acres so far.

The curve is still coming down, because there is so much development and growth that we are at the same time losing habitat, so it is a tough problem, especially in a big State like California. But I think you have to do it on a regional approach within the State of California.

Mr. CALVERT. I agree, and I look forward to working with you and other people on this committee toward that.

Mr. DICKS. Thank you, Mr. Chairman. I look forward to working with you.

Mr. VENTO. Thank you very much. You are welcome to stay.

Mr. VENTO. We are pleased to welcome the panel of administration witnesses, George Leonard, a long-time Associate Chief of the Forest Service, U.S. Department of Agriculture. He is accompanied by the scientists in the Service, Dr. James Sedell and Dr. Frederick Swanson, from the Pacific Northwest Forest and Range Experiment Station in Corvallis, Oregon.

We have Mike Penfold, the Associate Director of the Bureau of Land Management, Department of Interior. He is accompanied by Science Advisor, Mr. Jack Williams.

And we have Dr. Michael Tillman, the Acting Director of the Office of Protected Resources, Marine Fisheries Service, National Oceanic and Atmospheric Administration, United States Department of Commerce, accompanied by Nicholas Iadanza, Northwest Region, Portland, Oregon. And I see no objection raised at this point, so I assume he wouldn't correct me if he wanted to.

And finally we are pleased to welcome Mr. Gary Edwards, Assistant Director of Fisheries, United States Department of Interior.

I might say, before I invite you to participate, I note that your statements are present, and if you can summarize them, based on what we have to do today and the expectation of votes, it would be helpful; and I would appreciate that. And then we can get into dialogue to highlight the most important points relevant to land management and the impact on these critical populations.

Yesterday, in visiting with the President—those few of us that were invited, and I know that that list will be broadened as we move towards solution of the problem to all of our colleagues on the committee—I think that this administration very much is going to engage with the Members of Congress in terms of trying to find a

solution to the serious habitat and other environmental problems in the Pacific Northwest.

But I mentioned to the President that I had a lot of confidence in the professionals that work in the land management agencies, and that one of the reasons I thought that we were where we were today was because we hadn't permitted them to have enough voice, and so I hoped that he would—and the Vice President and others that were leading this effort would look to the professionals to help guide us along the proper policy path.

And so I am counting on all of you to provide and to make my observation a meaningful one with regards to the final solution and what we hope to accomplish in that area of land management.

As most of you know, I have relied on people in the Forest Service, in BLM, and other agencies for a long time, to put together various proposals, for the last four or five years. And as the knowledge changes, so have my proposals, so I hope that we are at a point where we can use this information as a benchmark and go forth. And I think, candidly, that many in the House and Congress look to that type of help and need that type of help.

We may take the credit for it, but I certainly understand that your help is invaluable in terms of accomplishing our ultimate objectives.

STATEMENT OF GEORGE LEONARD, ASSOCIATE CHIEF, FOREST SERVICE, U.S. DEPARTMENT OF AGRICULTURE, ACCOMPANIED BY DR. JAMES SEDELL AND DR. FREDERICK SWANSON, PACIFIC NORTHWEST FOREST AND RANGE EXPERIMENT STATION, CORVALLIS, OR; MIKE PENFOLD, ASSOCIATE DIRECTOR, BUREAU OF LAND MANAGEMENT, U.S. DEPARTMENT OF THE INTERIOR, ACCOMPANIED BY JACK WILLIAMS, BLM SCIENCE ADVISOR AND RON KAUFMAN; DR. MICHAEL TILLMAN, ACTING DIRECTOR, OFFICE OF PROTECTED RESOURCES, NATIONAL MARINE FISHERIES SERVICE, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, U.S. DEPARTMENT OF COMMERCE, ACCOMPANIED BY NICHOLAS IADANZA, CHIEF, HABITAT CONSERVATION BRANCH, NORTHWEST REGION, PORTLAND, OR; AND GARY EDWARDS, ASSISTANT DIRECTOR OF FISHERIES, U.S. FISH AND WILDLIFE SERVICE, DEPARTMENT OF THE INTERIOR

Mr. VENTO. Mr. Leonard, your statement is in the record by previous request.

STATEMENT OF GEORGE LEONARD

Mr. LEONARD. As you noted, I am accompanied at this time by Dr. Sedell and Dr. Swanson from our lab in Corvallis. Dr. Sedell's specialties are in the area of aquatic-land interactions, and Dr. Swanson has spent most of his research time looking at ecosystem processes.

The Forest Service is responsible for managing 191 million acres of land for multiple-use purposes. Our challenge is to manage with an ecosystem perspective for all uses while ensuring the protection of the soil, air, and water; these are crucial to the sound stewardship of fishery as habitat. We are committed to continually improv-

ing our management, consistent with new information, to sustain long-term sustainability of the resources under our care.

The watersheds of the National Forests encompass approximately one-half of the remaining freshwater anadromous fish spawning and rearing habitat in the lower 48 States and about one-quarter of such habitat in Alaska. Habitat conditions on National Forest System lands are important elements in conserving many of the Pacific anadromous fish stocks, and the penalties of degraded watersheds extend far beyond just the loss of fish stocks.

Watershed management and watershed health are related to nearly all of our resource programs in National Forests, such as fish habitat, timber, range, minerals and recreation.

Recent assessments made by Forest Service researchers and others have shown the stream systems in many watersheds in the Pacific Northwest have been degraded as a result of human activities. The reasons for the decline of the Pacific anadromous fish stocks vary by species and geographic area. Stock survival is threatened by hydroelectric development and operation, fish harvest, fish hatchery influences on disease and genetic fitness, and fish habitat conditions. For those stocks primarily affected by habitat factors, the management of watersheds to insure good fish habitat is important.

Management of these lands also can play an important role in moderating the decline for stocks affected by hydroelectric development and operations, hatcheries, and fish harvest, and providing a buffer against environmental extremes.

In November 1991, the National Marine Fisheries Service determined that the Snake River sockeye salmon was endangered. In April 1992, the Snake River spring/summer and fall Chinook salmon were listed as threatened. The protection the Forest Service has further afforded the stocks, because of their inclusion on the Endangered Species Act list, have complemented and built upon interregional agency efforts initiated earlier. These efforts were a result of the January 1991 Columbia River Basin Anadromous Fish Habitat Management Policy and Implementation Guide. This guide clearly shows the Forest Service's intent to proactively manage watersheds for the benefit of anadromous fish in the Columbia River Basin and to coordinate with other Federal, State, and tribal entities, and the public in these management efforts.

We have made progress in implementing many of the actions provided under the policy and implementation guide, but we recognize that only nine stocks identified by the American fisheries reported as being at risk have received formal protection under the Endangered Species Act. We recognize that aggressive preventive actions need to be taken to preclude the need for future listing of some of these "at risk" stocks. In an effort to address the issue of declining fish stocks in the Northwest, we initiated a team effort early last spring to undertake an assessment and develop a management strategy that extends beyond the Columbia River Basin and addresses the "at risk" stocks in the National Forests. This effort is staffed by technical specialists and managers from the National Forest System and research scientists from our research organization. The Forest Service is focusing on management of entire watersheds and will use an ecosystem management approach that

requires understanding of watershed functions and processes and how management activities affect stream channels, water flows, water quality, and sediment and woody debris delivery.

Changes are needed to improve protection of management in watersheds and Pacific anadromous fish habitat management in certain areas. Priorities will be established to maintain habitats that are currently in good condition.

The Forest Service is committed and ready to do its part in providing habitat capable of supporting the recovery of listed fish stocks and in providing the protection necessary to prevent the need to list other sensitive stocks in the future. Based on the information from one of the strongest research units in the world, we have better knowledge of what is needed to provide good fisheries habitat, and how to develop watershed programs.

Mr. Chairman, thank you for the opportunity to present that statement. We will be prepared to answer any questions.

Mr. VENTO. And we will have questions. Thank you very much for summarizing your statement, Mr. Leonard.

[Prepared statement of Mr. Leonard follows:]

STATEMENT OF
GEORGE E. LEONARD, ASSOCIATE CHIEF
FOREST SERVICE
UNITED STATES DEPARTMENT OF AGRICULTURE

Before the
Subcommittee on National Parks, Forests and Public Lands
Committee on Natural Resources
United States House of Representatives

Concerning watershed and fish habitat degradation on public lands and National Forests in the Pacific Northwest.

March 11, 1993

MR. CHAIRMAN AND MEMBERS OF THE SUBCOMMITTEE:

Thank you for the opportunity to offer our views on the conditions of the watersheds and fish habitat on the National Forests of the Pacific Northwest. I am accompanied today by Drs. James Sedell and Frederick Swanson, research scientists from our Forestry Sciences Laboratory in Corvallis, Oregon.

THE FOREST SERVICE HAS AN IMPORTANT ROLE TO PLAY IN THE MANAGEMENT OF WATERSHEDS AND FISH HABITAT IN THE PACIFIC NORTHWEST.

The Forest Service is responsible for managing for multiple-use purposes the 191-million acres of forest and range land that comprise the National Forest System. The challenge for the Forest Service is to manage with an ecosystem perspective for all uses while ensuring the protection of the basic resources of soil, water, and air that are crucial to the sound stewardship of fisheries habitat. We are committed to continually improving our management, consistent with new information, to assure long-term sustainability of the resources under our care.

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Our basic mission has not changed since our Agency was created. We are responsible for ensuring the protection of watershed conditions while managing for multiple-use sustained yield purposes. Our understanding of what is required to comply with that mission, however, has evolved and changed with increased awareness and understanding of ecosystem processes and functions. (A short history is included in a Supplemental Statement.) In June 1992, Forest Service Chief Robertson issued an ecosystem management policy statement that initiated the development of management programs that fully incorporate our current understanding of ecosystems, and the impacts of proposed activities. We now more fully appreciate that management of the aquatic ecosystem must involve a consideration of the whole watershed. It is what we do on the entire watershed that shapes the characteristics of the stream courses and water bodies that lie within its boundaries that provide fish habitat. Rivers of the Pacific Northwest traverse a variety of land uses and ownership. The headwaters of many river systems lie on the National Forests while the remainder of the river is held privately. The rivers and their water quality are impinged by municipal waste treatment plants, shipping, dredging, mining, diversions, hydroelectric impoundments and production, agriculture use, and a variety of other uses. Fish habitat on the National Forests is but one component of the equation.

The watersheds on the National Forests encompass approximately one-half of the remaining freshwater anadromous fish spawning and rearing habitat in the lower 48 states and about one-quarter of such habitat in Alaska. Habitat conditions on National Forest System lands are an important element in conserving many of the Pacific anadromous fish stocks. Forest Service efforts to manage this habitat requires commitment within five western Regions, encompassing the States of California, Oregon, Washington, Idaho, and Alaska.

THIS ISSUE IS IMPORTANT FOR ECONOMIC, CULTURAL AND ECOLOGICAL REASONS.

Historically, Pacific Coast salmon, steelhead and sea-run cutthroat trout resources have provided economic, subsistence, cultural, religious, symbolic, recreational, and psychological benefits to native people and other residents of the Pacific Northwest. In the mid-1980's, annual ex-vessel values of U.S. and Canadian commercial salmon landings were over $500 million. Expenditures on salmon sport fishing trips for the Pacific Northwest averaged about $162 million, and Pacific anadromous fishes supported a subsistence fishery in California, the Pacific Northwest, and Alaska. Healthy watersheds are a prerequisite for long-term sustainability of resources, and the penalties of degraded watersheds extend far beyond the loss of fish stocks. Watershed management is related to nearly all other resource programs on National Forests, such as fish habitat, timber, range, minerals and recreation.

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NEW INFORMATION HAS DEFINED THE ANADROMOUS FISH ISSUE.

In 1991, the American Fisheries Society (AFS) identified 214 stocks of salmon, steelhead and sea-run cutthroat trout from California, Oregon, Washington, and Idaho as "at risk" of extinction or "of special concern." Of those stocks, nine of the stocks were included into four distinct populations by the National Marine Fisheries Service and were subsequently listed under the Endangered Species Act. The Forest Service has designated some of the other stocks as sensitive species for management emphasis. Approximately 134 "at risk" stocks identified by the AFS report are found on National Forests. Of those, 55 judged by AFS to be at "high risk" of extinction, but not federally listed, occur in 39 stream systems on 16 National Forests. To complete our understanding of the status of Pacific anadromous fish stocks, a review similar to the one published by AFS is needed for Alaska salmon, steelhead, and sea-run cutthroat stocks. Recent information suggests that coho and chum salmon, and steelhead stocks in Alaska probably are declining.

Recent assessments made by our own Forest Service research has shown that stream systems in many watersheds throughout the Pacific Northwest have been degraded and need improvement, as a result of the effects of man's activities on watersheds and fish habitat. For example, the number of large, deep pools in many tributaries of the Columbia River, have decreased in the past

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50 years. This was determined by comparing quantitative habitat surveys, completed between 1989 and 1992, with surveys done by the Bureau of Fisheries, now the National Marine Fisheries Service, between 1936 and 1942. The Bureau of Fisheries surveys are unique because they are the only long-term data set that quantifies fish habitat in a way that is replicable over time. In the Washington and Oregon Cascade Mountains, and Middle Fork Salmon River in Idaho, the historical surveys were generally in pristine areas that had not been extensively roaded and harvested. Over all, there has been a 30 to 70 percent reduction in the number of large, deep pools in resurveyed streams on National Forests within the range of anadromous fish over the last 50 years.

HYDRO, HATCHERIES, HARVEST, AND HABITAT ARE THE FOUR PRIMARY MANAGEMENT FACTORS CONTRIBUTING TO THE DECLINE IN STOCKS.

The reasons for the decline of the Pacific anadromous fish stocks vary by species and geographic area. The depressed status of the stocks reflects the interaction of inherently variable environmental conditions, such as oceanic productivity and weather patterns, and a variety of management activities. In general, stock survival is threatened by some combination of hydroelectric development and operation, fish harvest, fish hatchery influences on disease and genetic fitness, and fish habitat conditions. For those stocks affected primarily by habitat factors, the management of watersheds to ensure good fish habitat on National Forest System lands is important. Management of National Forest System lands also can play an important role in moderating the rate of decline for those

stocks affected primarily by hydroelectric development and operations, hatcheries, and fish harvest, and providing a buffer against environmental extremes.

THE FOREST SERVICE ALREADY HAS DONE MUCH TO RESPOND TO THE NEEDS OF THE LISTED STOCKS IN THE COLUMBIA RIVER BASIN.

In November 1991, the National Marine Fisheries Service (NMFS) determined that the Snake River sockeye salmon was endangered. In April 1992, NMFS determined the Snake River spring/summer and fall chinook salmon were threatened. The protections the Forest Service has further afforded the stocks because of their inclusion on the Endangered Species Act list, have complemented and built upon inter-regional agency efforts initiated earlier. These efforts were a result of the January 1991 Columbia River Basin Anadromous Fish Habitat Management Policy and Implementation Guide (CRBPIG), and Agency participation in the 1990/91 Pacific Northwest Salmon Summit sponsored by Senator Hatfield.

The CRBPIG affects 18 National Forests in the Columbia River Basin, and approximately 10,000 miles of anadromous fish habitat representing well over 50 percent of the remaining spawning and rearing habitat accessible to anadromous fish within the Basin. The CRBPIG clearly articulates the Forest Service's intent to proactively manage watersheds for the benefit of anadromous fish in the Columbia River Basin and to coordinate with other Federal, State, and tribal entities, and the public in these management efforts.

Consistent with our commitment at the Pacific Northwest Salmon Summit, progress on implementing the CRBPIG has been substantial. National Forests in the Columbia River Basin have delineated forest watersheds, and this year will concentrate on describing changes in existing protection and management for these watersheds, and establishing monitoring programs to ensure our management leads to improvement in watershed conditions. These efforts are part of the Forest planning process and may lead to adjustments in plans as necessary.

We have made progress on the other commitments made by the Forest Service at the conclusion of the Pacific Northwest Salmon Summit. We have identified irrigation diversions on National Forests and advised the permittees that screening will become a requirement of the special use permit on all diversions according to criteria established by the respective states. Lands appropriate for acquisition by the Agency through the Land and Water Conservation Fund, that would enable better management of anadromous fish habitat, have been identified. Additionally, the Forest Service will be submitting a listing of lands available for acquisition to the Northwest Power Planning Council, on or before April 1, 1993. The Agency also has accelerated its minerals and range management and administration to improve watershed conditions with an emphasis on riparian and aquatic habitat conditions within the Columbia River Basin.

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The Forest Service has been involved in a major undertaking with the NMFS to comply with the consultation provisions of the Endangered Species Act for the listed Snake River salmon stocks. Pursuant to a procedure jointly developed by the NMFS and the Forest Service in May 1992, an evaluation and description of all ongoing activities have been completed on 4,900 projects and submitted to the National Marine Fisheries Service for consultation. From that experience, the two Agencies developed and agreed to an outline in December 1992 for expanding the information provided to complete consultation. In January 1993, an interagency protocol was established to expedite the consultation process. Following these guidelines, the Forest Service will be asking for formal consultation on ongoing and proposed projects that "may affect" listed stocks. The NMFS has agreed to conclude consultations expeditiously to ensure that ongoing and proposed actions on National Forests will not be unduly delayed by processing bottlenecks.

THE FOREST SERVICE IS DEVELOPING A NEW STRATEGY--A PROACTIVE APPROACH TO ECOSYSTEM MANAGEMENT OF WATERSHEDS AND ANADROMOUS FISH HABITAT ON NATIONAL FORESTS

Only nine of the stocks identified by the AFS report have received formal protection under the Endangered Species Act. However, the Forest Service recognizes that aggressive preventive actions need to be taken to preclude the need for future listing of some of these "at risk" stocks.

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In an effort to address the issue of declining fish stocks in the Pacific Northwest, we initiated a team effort early last spring to undertake an assessment and develop a management strategy that extends beyond the Columbia River Basin and addresses the needs of all Pacific anadromous "at risk" stocks on National Forests. This effort is staffed with technical specialists and managers from our National Forest System and research scientists from our Research organization. The Forest Service is focusing on management of entire watersheds, and will use an ecosystem management approach that requires an intimate understanding of watershed functions and processes and how management activities effect stream channels, water flows, water quality, and sediment and woody debris delivery.

As part of the assessment, Forest Service research scientists, working with fisheries biologists and watershed specialists on National Forests with Pacific anadromous fish habitat, have characterized current habitat conditions in many watersheds on National Forests and other lands in the Pacific Northwest as being degraded. Generally, these streams have fewer pools, higher fine sediments in spawning gravels, and greater disturbance of riparian vegetation resulting in reduced fish habitat capabilities. While these downward trends in habitat conditions represent the cumulative effects, across all ownerships, of past and present land management activities, it should be noted the best remaining fish habitat in the Pacific Northwest is found on the National Forests. With the help of historic inventory and survey data, as well as current research,

we also have defined "good" anadromous fish habitat conditions. Further, our research and management biologists have identified how to manage watersheds to maintain "good" habitat where it now occurs, and achieve "good" habitat conditions in areas that currently are degraded.

In accord with our ongoing effort to develop a strategy, we are identifying key watersheds that provide habitat important to "at risk" stocks. We are defining riparian habitat conservation areas where particular management sensitivity is warranted that goes beyond the traditional riparian corridor along permanent fish-bearing stream segments. These areas include areas of unstable soils, wetlands, intermittent headwater streams, and other areas where proper ecologic functioning is crucial to maintenance of the water, sediment, and nutrient delivery systems of the river system. Through site specific watershed analyses and building on a strong scientific foundation, the Forest Service will establish new criteria as needed for adjusting Forest Plans and programs on all National Forests that support Pacific anadromous fish stocks. Finally, we are evaluating the economic, cultural, and social impacts of our management options that are under consideration. We recognize that for this effort to be successful it will require the extensive involvement of other Federal Agencies, tribal, State and local governments, and other interested parties. Our specific strategy is being developed in concert with other Administration efforts and will be released in the next several months.

HABITAT RESTORATION WILL TAKE TIME AND COMMITMENT.

Changes are needed to improve protection and management of watersheds and Pacific anadromous fish habitat management in certain areas. Priorities will be established to maintain habitats that are in good condition and restore habitats in degraded watersheds. More and better information is needed on the watersheds under our care, and careful monitoring of how the watersheds respond to management activities will be required. It is important to be cognizant of the fact that regardless of how well we do our job, or how aggressive and proactive we are in our management programs, habitat restoration will take time. After restoration projects are completed, we can expect nature to take 10 to 60 years for the healing process to result in marked improvements in habitat condition. Improvement will occur, but it will take time for the watersheds to respond to treatment and changes in management programs.

THE FOREST SERVICE IS READY TO DO ITS PART.

The Forest Service is committed and ready to do its part in providing habitat capable of supporting the recovery of listed fish stocks, and in providing the protection necessary to prevent the need to list other sensitive stocks in the future. Based on information from one of the strongest research units in the world, we have better knowledge of what is needed to provide for good fisheries habitat, and how to develop watershed

management programs based on the principles of ecosystem management.

Finally, it must be recognized that habitat problems are only one element contributing to the decline of Pacific anadromous fish stocks. Impacts associated with hydroelectric development and operations, fish hatcheries, and fish harvest, also must be addressed to provide for the conservation of the vulnerable stocks.

I thank the members of the Subcommittee for the opportunity to testify on this complex problem and I ask that the supplemental statement be made a part of the hearing record.

Mr. Chairman, this concludes my testimony. Dr. Sedell, Dr. Swanson, and I will be happy to answer any questions you may have.

SUPPLEMENTAL STATEMENT

UNITED STATES DEPARTMENT OF AGRICULTURE

A Short History of Watershed and Fisheries Habitat Management on the National Forests

SINCE ITS ESTABLISHMENT, THE FOREST SERVICE HAS BEEN MANAGING WATERSHEDS AND ANADROMOUS FISH HABITAT.

Providing for favorable condition of water flow and maintaining hydrologic function is a primary goal of the Organic Administration Act of 1897. The Forest Service's watershed management program provides for protection of watershed condition in the conduct of other activities by providing technical support to ensure that practices are designed to minimize impacts to acceptable levels. The Forest Service's nonpoint source management strategy is a preventive program based on design and application of practices that are expected to provide the necessary protection of water dependent resources, monitoring to determine effectiveness of practices, mitigation to correct for unforseen problems, and adjustment of practice design where appropriate.

In addition to preventing problems from ongoing activities, the Forest Service has a program to restore watersheds impacted by past activities. We have a current inventory of those National Forest System lands that are in need of improvement. This

inventory includes watershed improvement needs for all National Forest System lands. When we have completed our watershed analysis and examination of habitat for fish in the Pacific Northwest, we expect to find additional acres in need of improvement.

The Forest Service's watershed management program has grown significantly since its inception in the early 1960's. Environmental legislation passed in the 1970's resulted in an expanded Forest Service watershed program related to protection of watershed conditions and water quality. Budget allocations for watershed management increased along with these new roles and responsibilities. This year our watershed budget is $68 million. About $13 million is dedicated to improving watershed conditions.

The Forest Service's fish habitat management program also has grown significantly since the Agency's inception. Triggered by the additional mandate of legislation in the 60's and 70's, funds dedicated to fish habitat management grew through the early 1980's. In 1987, with the help of State fisheries management partners and private constituency groups, specific fisheries program goals and objectives were developed and the Forest Service "Rise To The Future" fisheries program was established.

The fish habitat management program protects, restores, and enhances fish habitat with the benefit of the strong scientific

underpinning provided by Forest Service's research scientists. Fisheries biologists are involved in ensuring that necessary protection measures are incorporated in all management activities on the National Forests. This year, the Forest Service's fisheries budget is just over $46 million, of which approximately $27 million is dedicated to anadromous fish habitat management. Better ecological knowledge and increased funding and staffing have resulted in substantial improvements in fish habitat management and in increased recreational opportunities for the public.

DEMANDS ON THE AGENCY HAVE CHANGED OVER TIME.

The demands of the American people and their expectations of the National Forests have changed over the years. The Forest Service has worked hard to adjust to these changes. Prior to World War II, the Agency's management activities were primarily custodial in nature. Then, from the 1930's to the 1960's, timber production increased from approximately 1-billion board feet to 10.6-billion board feet, and is now approximately 8.7-billion board feet. Recreation use increased from approximately 10 thousand recreation visitor days in the 1930's to 279 thousand recreation visitor days today. Oil and gas produced from the National Forests increased almost 99 percent from 1930 to 1990.

In recent years, the Forest Service has attempted to meet greatly increased public demands for the full range of goods and services while at the same time addressing the growing public concern over a broad array of environmental issues. Today, the Forest Service, with the involvement of the public and the Congress, must make choices between competing resources uses.

Following the passage of the National Forest Management Act in 1976, we developed Forest Land and Resource Management Plans based on known demands and the best technical information available at the time. We now are working to adjust to new scientific information and meeting new societal expectations for biological diversity and ecosystem management.

The Forest Service's workforce is changing over time in response to the growing awareness of ecosystem and watershed management. Responding to the need for technical information, the Forest Service hired its first soil scientists in 1958, fisheries biologists in the late-1950's, and hydrologists in the mid-1960's. By 1980, the Agency employed about 300 soil scientists, 200 hydrologist, and 100 fisheries biologists. Today we employ 260 soil scientists, 270 hydrologists, and nearly 300 fisheries biologists, of which about 75 percent are in the field. We will continue to adjust our orgainization and strategies to meet changing resource management priorities.

Mr. VENTO. Let me turn now to the BLM witness, Mr. Penfold.

STATEMENT OF MICHAEL PENFOLD

Mr. PENFOLD. Mr. Chairman, I am very appreciative of the opportunity to be here and thank you very much for your comments and constant support for the professional side of the BLM; I have a couple of professional staff people with me. Dr. Jack Williams is our BLM Science Advisor; Dr. Williams had been head of our fisheries program before taking this new position. He also is the co-author of the American Fishery Society report, Pacific Salmon at the Crossroads, which was a definitive document in illustrating the problem that we are talking about today.

I also have with me Mr. Ron Kaufman, who is one of our District Managers. He is the District Manager from Eugene, Oregon. Mr. Kaufman has been on the firing line of land management for three decades out in the Pacific Northwest, and I brought him in for the purposes of making him available for any questions that you might have for somebody who has been on that firing line.

I am going to touch on some of the key and important parts of our testimony. The BLM administers approximately 180,000 miles of streams and a large number of diverse watersheds. A great number of those are in Alaska, and are salmon streams; but also a great number are in Idaho and Oregon.

We recognize the severity and extent of watershed degradation in the Pacific Northwest, as well as the environmental, social and economic consequences of watershed dysfunction. The July 1992 report, Management of Anadromous Salmon and Trout Habitat and Their Status in the Salem District, illustrates the magnitude of the issue on BLM public lands. For instance, the BLM's Salem District in western Oregon manages 28,000 acres of riparian habitat along 633 miles of perennial stream. There are 211 miles of streams in 16 drainage areas containing anadromous salmon and trout, which support 33 of the 214 stocks at risk as identified by the 1991 American Fisheries Society report, Pacific Salmon at the Crossroads. Of the 28,000 acres of riparian habitat in the district, 41 percent are in poor condition, 31 percent we consider fair, and 28 percent optimum. Of the 211 stream miles supporting anadromous fishes, 42 percent of stream channels are in poor condition, 35 percent fair, and 23 optimum.

This is not good enough.

The BLM has been moving in a variety of ways to protect and manage these watersheds and the resources upon which they depend. Protection of anadromous fish such as steelhead and salmon has been a driving force behind many of our efforts. These fish are of critical importance to the cultural, economic, and recreational well-being of the Pacific Northwest. The BLM has addressed salmon habitat management through two plans known as the Anadromous Fish Habitat Management Strategic Plan on Public Lands and Anadromous Fish Habitat Management Plan for the Columbia and Snake River. These plans, which are component plans for BLM's Fish and Wildlife 200 initiative, outline habitat projects, acquisition, and management needs. They are designed to enhance the productivity of anadromous fish streams on public lands in Oregon, Washington, and Idaho. Some $2 million in Oregon and

Washington has been expended for implementation of habitat enhancement project under these plans. Additional amounts were expended in California and Idaho.

The BLM currently is developing a series of resource management plans to guide our actions on 2.2 million acres of Oregon and California lands in western Oregon. These plans will contain the necessary stipulations, standards, and guidelines to conserve "at risk" stocks of salmon, steelhead and sea-run cutthroat trout. These actions not only will protect fish-bearing streams, but restore channel integrity of non-fish-bearing intermittent streams. The BLM will strive to incorporate the best scientific information available into the draft RMPs before finalization. Information made available through President Clinton's upcoming Forest Conference will be an important input as to how these are finalized.

I might add a side comment. We had American Rivers do a study of our effort across the country recently and they gave us a critical critique of our past planning efforts, that they don't adequately cover the fish directions that we need in these plans. So that has been an important activity. And we now see these two plans that I just mentioned as important, to dovetail those closely with the Forest Service activities so that these can be more comprehensive than they have been in the past. We think that is an important step forward.

The BLM is also addressing the rising concern for the decline of anadromous fish stocks in the Pacific Northwest through a recent revision and expansion of its strategy plan entitled Anadromous Fish Habitat Management and Funding Strategy for the Columbia and Snake River Basins. Full implementation of this plan will dramatically improve habitat conditions for anadromous fish on BLM lands in the Willamette, Columbia and Snake River Basins. Restoring habitat eventually will increase the productive capability for anadromous salmonids on BLM lands, and if other nonhabitat-related problems are solved, more fish will be available for recreational, commercial and tribal fishing. Major management actions that will be required include stream inventory, watershed plan development, watershed restoration, monitoring and project maintenance.

As part of the management approach, we have established showcase areas in each State; demonstration areas are also being used for educational and scientific purposes. We understand that our efforts to manage and restore watersheds cannot occur in isolation. That is why we actively participate in ongoing interagency efforts to restore salmon habitat in the Pacific Northwest. Currently, we are updating our National—as I mentioned—the National Marine Fishery Service are part of that effort.

In 1992, the BLM received a $560,000 congressional add-on for work in the Columbia River Basin. Work has begun on modifying grazing and forestry management plans to address stream improvement issues. Over the next three years, the BLM will revise 175 grazing allotment plans in Oregon, 90 in Washington, and 85 in Idaho. Stream improvement work has begun on 57 miles of the Salmon, Willamette, John Day, and Walla Walla Rivers.

In addition to modifying forestry management plans, the BLM is incorporating fish habitat and watershed improvement practices

into the operations practices of timber management. For example, new timber sales seek to repair damage done in the past. Improved road surfacing and drainage systems are applied to reduce the amount of sediments reaching streams. Culvert stream crossings are replaced with larger culverts or arched to allow for better fish passage. Damage resulting from past road-building practices is being mitigated by better road construction.

Additionally, we have made progress in improving habitat conditions. We have constructed a 3,400-foot-long rearing channel along the Trinity River to enhance anadromous fish-rearing habitat. In the BLM's Coos Bay District, another 17 miles of spawning habitat are now available for coho salmon and steelhead resulting from the completion of the Brewster Gorge fish passage project. The BLM's Salem District has extensively rehabilitated Upper Lobster Creek.

The results of restoration efforts have been impressive in other areas as well. Stream surface area has more than doubled in the Nestucca/Alsea project areas of Oregon, resulting in increased juvenile and adult fish production in treated areas.

In addition to our efforts for anadromous fish, we are moving ahead with a dynamic effort to restore riparian areas, and have made considerable progress in this initiative.

For example, OR/WA has adopted a riparian enhancement plan that recognizes the important functions and values of riparian areas and directs the BLM's efforts at improving riparian conditions in eastern Oregon and Washington. Objectives of this plan include improving riparian conditions on 656 miles of the BLM-administered streams.

BLM also cooperates in the COPE project, which is a fisheries-specific study in the Pacific Northwest. And we were provided with $1.3 million in funding for that activity.

I would like to also point out the partnership system, a very important part of what we do. We must work with State governments and the private sector in carrying out these plans, and we think partnerships in working with the private sector are a critically important part of getting a holistic approach to the issues that we are here to talk about. We believe that by implementing our plans, we can restore watersheds on BLM land.

We believe that by fully implementing our strategy plans for anadromous fish and riparian wetland restoration in the Pacific Northwest, we can achieve restored watersheds on the BLM lands. Our experience thus far has taught us that the problem of restoring and maintaining sound and productive watershed and fish habitat areas requires an approach that transcends agency boundaries and land ownership. We commend the Pacific Rivers Council for its efforts toward this end. We've got to work with partners to carry out those goals.

I have copies of the reports, if your committee would like to have copies of them.

Thank you, Mr. Chairman. And we will be happy to answer questions.

[Prepared statement of Mr. Penfold follows:]

MAR 11 1993

STATEMENT OF MICHAEL PENFOLD, ASSISTANT DIRECTOR, LAND AND RENEWABLE RESOURCES, BUREAU OF LAND MANAGEMENT, UNITED STATES DEPARTMENT OF THE INTERIOR, BEFORE THE SUBCOMMITTEE ON NATIONAL PARKS, FORESTS AND PUBLIC LANDS, COMMITTEE ON NATURAL RESOURCES, UNITED STATES HOUSE OF REPRESENTATIVES, ON WATERSHED AND FISH HABITAT DEGRADATION ON PUBLIC LANDS AND NATIONAL FORESTS IN THE PACIFIC NORTHWEST.

I appreciate the opportunity to address the Committee on the Bureau of Land Management's (BLM) efforts in the management and recovery of watersheds and fish habitat in the Pacific Northwest. The BLM administers approximately 180,000 miles of streams and a large number of diverse watersheds. Of the 180,000 miles of streams administered by the BLM, approximately 133,000 are in Alaska, 1,420 in California, 4,140 in Idaho and 7,639 in Oregon and Washington.

The BLM fully recognizes the severity and extent of watershed degradation in the Pacific Northwest as well as the environmental, social and economic consequences of watershed dysfunction. The July 1992 report, Management of Anadromous Salmon and Trout Habitat and Their Status in the Salem District, illustrates the magnitude of the issue on BLM public lands. For instance, the BLM's Salem District in western Oregon manages 28,000 acres of riparian habitat along 633 miles of perennial stream. There are 211 miles of streams in 16 drainage areas containing anadromous salmon and trout, which support 33 of the 214 stocks at risk as identified by the 1991 American Fisheries Society (AFS) report, Pacific Salmon at the Crossroads. Of the 28,000 acres of riparian habitat in the District, 41% are in poor condition, 31% fair, and 28% optimum. Of the 211 stream miles

supporting anadromous fishes, 42% of stream channels are in poor condition, 35% fair, and 23% optimum.

Watershed degradation impacts all lands and land uses throughout the region. Rangelands and forestlands, agricultural and urban lands all need to be considered as restoration proceeds. The BLM recognizes its responsibility to improve the condition of riparian habitats and restore ecological processes and functions to the public lands. Such actions are important elements in conserving biological diversity, maintaining water quality and quantity, and providing long-term continuation of forest and rangeland resources.

The BLM has been moving in a variety of ways to protect and manage these watersheds and the resources upon which they depend. Protection of anadromous fish such as steelhead and salmon has been a driving force behind many of our efforts. These fish are of critical importance to the cultural, economic, and recreational well-being of the Pacific Northwest. The BLM has addressed salmon habitat management through two plans known as the Anadromous Fish Habitat Management Strategic Plan on Public Lands and Anadromous Fish Habitat Management Plan for the Columbia and Snake River. These plans, which are component plans for BLM's Fish and Wildlife 2000 initiative, outline habitat projects, acquisition, and management needs. They are designed to enhance the productivity of anadromous fish streams on public

lands in Oregon, Washington, and Idaho. Some $2 million in Oregon and Washington (OR\WA) has been expended for implementation of habitat enhancement projects under these plans. Additional amounts were expended in California and Idaho.

The BLM currently is developing a series of Resource Management Plans (RMP's) to guide our actions on 2.2 million acres of Oregon & California (O&C) lands in western Oregon. These plans will contain the necessary stipulations, standards, and guidelines, to conserve at risk stocks of salmon, steelhead and sea-run cutthroat trout. These actions not only will protect fish-bearing streams, but restore channel integrity of non fish-bearing intermittent streams. The BLM will strive to incorporate the best scientific information available into the draft RMP's before finalization. Information made available through President Clinton's upcoming Forest Summit will also be included in the RMPs as appropriate.

The 1991 AFS report documented the decline of 214 discrete stocks of West Coast salmon and steelhead trout. Several of these stocks, including runs of sockeye and chinook in the upper Columbia and Snake Rivers, are now listed as threatened and endangered species. The BLM administers nearly 2,000 miles of spawning and rearing habitat for salmon, steelhead, and sea-run cutthroat trout in streams of the Pacific Northwest. In that region, the BLM manages habitat for 109 of the 214 stocks

identified in the AFS report. In response to these listings, and through the BLM's participation in the Pacific Northwest Salmon Summit, the BLM has become an active participant in restoring spawning, rearing, and wintering habitat on public lands.

The BLM is also addressing the rising concern for the decline of anadromous fish stocks in the Pacific Northwest through a recent revision and expansion of its strategy plan entitled Anadromous Fish Habitat Management and Funding Strategy for the Columbia and Snake River Basins. Full implementation of this plan will dramatically improve habitat conditions for anadromous fish on BLM lands in the Willamette, Columbia and Snake River Basins. Restoring habitat eventually will increase the productive capability for anadromous salmonids on BLM lands, and if other non habitat related problems are solved, more fish will be available for recreational, commercial and tribal fishing. Major management actions that will be required include stream inventory, watershed plan development, watershed restoration, monitoring and project maintenance.

In 1992, the BLM received a $560,000 Congressional add-on for work in the Columbia River Basin. Work has begun on modifying grazing and forestry management plans to address stream improvement issues. Over the next 3 years, the BLM will revise 175 grazing allotment plans in Oregon, 90 in Washington, and 85 in Idaho. Stream improvement work has begun on 57 miles of the

Salmon, Willamette John Day, and Walla Walla Rivers.

In addition to modifying forestry management plans, the BLM is incorporating fish habitat and watershed improvement practices into the operational practices of timber management. For example, new timber sales seek to repair damage done in the past. Improved road surfacing and drainage systems are applied to reduce the amount of sediments reaching streams. Culvert stream crossings are replaced with larger culverts or arched to allow for better fish passage. Damage resulting from past road building practices is being mitigated by better road construction.

Additionally, we have made progress in improving habitat conditions. We have constructed a 1,400 foot long rearing channel along the Trinity River to enhance anadromous fish rearing habitat. In the BLM's Coos Bay District, another 17 miles of spawning habitat are now available for coho salmon and steelhead resulting from the completion of the Brewster Gorge fish passage project. The BLM's Salem District has extensively rehabilitated Upper Lobster Creek.

The results of restoration efforts have been impressive in other areas as well. Stream surface area has more than doubled in the Nestucca/Alsea project areas in Oregon, resulting in increased juvenile and adult fish production in treated areas.

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In addition to our efforts for anadromous fish, we are moving ahead with a dynamic effort to restore riparian areas, and have made considerable progress in this initiative. Our efforts are guided by Fish and Wildlife 2000 and by our nationwide strategy plan called Riparian-Wetland Initiative for the 1990's.

For example, OR\WA has adopted a riparian enhancement plan that recognizes the important functions and values of riparian areas and directs the BLM's efforts at improving riparian conditions in eastern Oregon and Washington. Objectives of this plan include improving riparian conditions on 686 miles of the BLM administered streams by 2010 through grazing management and strategically planned enhancement projects. Since 1987, the BLM has improved approximately 65% of riparian areas of streams included in the OR\WA Riparian Enhancement Plan. Through these efforts, the BLM has learned a great deal about riparian areas and their role in watershed function. This has helped us develop our approach so that it encompasses a watershed-wide view. We have increased the riparian areas that will receive attention and have included western Oregon O&C lands in the OR\WA Riparian Program. We are striving to manage these riparian-wetland areas for multiple uses, using the bio-diversity and total ecosystem management concepts.

Fisheries and other values are benefiting as a result of the improved riparian conditions. The increased riparian growth

provides streamside shade and cools surface waters. Wood debris is added to streams to create valuable pool habitat and decrease erosion from streambanks. Healthy riparian areas also raise the water table, cool streams, and increase the quality and quantity of forage for wildlife and livestock.

Each of our State Offices has specific plans and strategies for restoring riparian areas, fish habitat and watersheds in general, as funds become available. As a part of our management approach, we have established showcase areas in each state. These showcase areas demonstrate that well-managed riparian areas can produce multiple benefits while remaining healthy. Showcase and demonstration areas are also being used for educational and scientific purposes.

We recognize that our efforts to manage and restore watersheds cannot occur in isolation. That is why we are an active participant in ongoing interagency efforts to restore salmon habitat in the Pacific Northwest, as well as many other cooperative ventures. Currently, we are updating our national Anadromous Fish Habitat Strategy Plan in collaboration with the Forest Service. We also are exploring other efforts with the Forest Service, Fish and Wildlife Service, National Marine Fisheries Service, and others to ensure a better coordinated effort on behalf of salmon habitat and watershed restoration throughout the Pacific Northwest.

The BLM cooperates with and contributes to the Coastal Oregon Productivity Enhancement Project (COPE). COPE is a project of Oregon State University and is researching ways to manage coastal Oregon watersheds to enhance resource values. This research is currently part of a 10 year program slated to continue until the late 1990's. BLM currently provides $1.3 million per year in addition to funds to conduct the operational work on study sites located on land managed by the BLM.

Partnership agreements are a major cornerstone to the successful implementation of our strategy plans. This collaborative approach with outside partners enables the BLM to stretch Federally appropriated funds and accelerate management and recovery of millions of acres of habitat. It also means involvement of concerned citizens in the BLM management of fish and wildlife, and other elements of watershed restoration.

We are using a holistic approach to riparian-wetland management that, where possible, focuses on the entire ecosystem and involves all affected landowners. An example of how the BLM is implementing ecosystem management is through coordinated resource management planning. This method of group planning considers the needs and objectives of all landowners and interest groups relating to the watersheds targeted for management. For instance, the BLM and the Trout Creek Mountain Working Group in Oregon, consisting of several ranchers and environmental groups,

implemented a management plan to restore Lahontan cutthroat trout habitat in 160 miles of stream in southeast Oregon. The BLM is involved in a number of similar efforts elsewhere.

We believe that by fully implementing our strategy plans for anadromous fish and riparian wetland restoration in the Pacific Northwest, we can achieve restored watersheds on the BLM lands. Our experience thus far has taught us that the problem of restoring and maintaining sound and productive watershed and fish habitat areas requires an approach that transcends agency boundaries and land ownership. We commend the Pacific Rivers Council for its efforts toward this end. In recognition of the need for mutual cooperation among all interested parties, we plan to expand our partnerships in the Pacific Northwest. Working partnerships will help us to better carry out our goals of improving watershed health.

Examples of our work that I have discussed are outlined in our 1992 Report of Accomplishments. I would be happy to supply a copy of our report and copies of our Anadromous Fish Habitat Strategy Plan and Riparian-Wetland Plan for the 1990's for the record.

This concludes my prepared remarks. I would be happy to answer any questions that the Committee may have.

Mr. VENTO. Thank you for summarizing your comments and for your thoughtful and kind remarks.

We have two additional witnesses. We have a lot of agencies working on these problems, obviously, that influence land use, so we are pleased to welcome Dr. Michael Tillman, the Acting Director of the Office of Protected Resources, National Marine Fisheries Service, NOAA.

STATEMENT OF MICHAEL TILLMAN

Dr. TILLMAN. Thank you, Mr. Chairman.

I greatly appreciate the opportunity to provide the views of the Department of Commerce regarding watershed and fish habitat degradation on public lands and national forests. I will cover the agency's activities addressing this important issue.

As you requested, I will quickly summarize my testimony.

The Department has statutory responsibilities which authorize it, acting through the National Marine Fisheries Service, to protect, mitigate, and enhance anadromous fishery resources for the benefit of commercial and recreational fishing industries and tribal fisheries of the United States.

The National Marine Fisheries Service has Federal conservation and management responsibilities for marine, estuarine, and anadromous fishery resources under various laws, including the National Environmental Policy Act, the Clean Water Act, the Fish and Wildlife Coordination Act, the Magnuson Fishery Conservation and Management Act, and the Endangered Species Act.

Now, as in the past, Pacific coast salmon and steelhead resources provide a significant economic, subsistence, cultural, and recreational benefit to the people of the Pacific Northwest. Many of these stocks are now at risk.

The reasons for the declines vary by stock. For some, habitat degradation is a serious problem. However, maintaining suitable spawning and rearing habitat is vital to all of them.

Past land use practices have resulted in the degradation of many miles of streams that provided anadromous fish habitat. Much of the remaining habitat important for anadromous fish production is now on public lands.

Our Northwest Regional Office is currently conducting section 7 consultations in four major sectors that may or are likely to affect adversely the three salmon stocks in the Pacific Northwest that are currently listed under the Endangered Species Act. These four sectors, referred to as the four H's, are: hydropower, harvesting, habitat, and hatcheries.

These four sectors are an integral part of the economic and social structure of the Pacific Northwest. Therefore, it is essential that the Fisheries Service work with the Federal agencies responsible for managing the actions that comprise the four H's in an efficient and effective manner.

With respect to the habitat sector specifically, we are working closely with the U.S. Forest Service and the Bureau of Land Management. Actions from both these agencies include grazing, mining, road construction, recreation, fishery enhancement, timber sales, and salvage sales. Unless proper safeguards are taken as part of their planning and implementation, these actions have the poten-

tial to severely impact the remaining habitat necessary to maintain viable anadromous fish populations.

The Fisheries Service has met with the Forest Service several times to develop a more efficient process to review the thousands of actions requiring consultation. In January of this year, we jointly adopted a more comprehensive process for completing consultations. Basically, this approach will group actions by geographic area; that is, by watershed and by resource; and whether it is range, grazing, timber, mining and so on, rather than conducting project-by-project consultations.

The Forest Service will prioritize its actions and provide critical due dates to us. Also, we have jointly prepared a biological outline to ensure that the information we need to complete consultations is submitted to us. We are currently working with the Bureau of Land Management to adopt a similar approach. Once we have completed the necessary consultations with the Forest Service and BLM, we will have a better idea of the effect of their activities on listed species, and, to a degree, on other anadromous species as well.

In closing, we are focusing on the conservation of all anadromous stocks, not just the listed ones. Efforts to bring about the recovery of listed species and restore habitat can be very expensive. As Congressman Dicks pointed out earlier this morning, it is far more cost effective to prevent habitat from being degraded and to prevent species from becoming endangered in the first place.

Existing authorities should be used in a more innovative manner to reconcile and integrate human needs with the conservation of natural resources and their ecosystems. We need to develop better information on species and ecosystem processes to ensure decisions are made with the full knowledge of the potential risks.

Our goal is to maintain salmon and steelhead stocks as a vital resource unique to the Northwest that can be utilized and enjoyed by all.

Thank you, Mr. Chairman. That concludes my statement. I would be pleased to answer any questions you have.

Mr. VENTO. Thank you, Dr. Tillman.

[Prepared statement of Dr. Tillman follows:]

TESTIMONY
OF
DR. MICHAEL F. TILLMAN
ACTING DIRECTOR, OFFICE OF PROTECTED RESOURCES
NATIONAL MARINE FISHERIES SERVICE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
U.S. DEPARTMENT OF COMMERCE

BEFORE THE

SUBCOMMITTEE ON NATIONAL PARKS, FORESTS
AND PUBLIC LANDS
COMMITTEE ON NATURAL RESOURCES
U.S. HOUSE OF REPRESENTATIVES

MARCH 11, 1993

Mr. Chairman and Members of the Subcommittee:

My name is Dr. Michael Tillman. I am the Acting Director of the National Marine Fisheries Service's (NMFS) Office of Protected Resources, National Oceanic and Atmospheric Administration, U.S. Department of Commerce. I appreciate the opportunity to provide the Subcommittee with the views of the Department regarding watershed and fish habitat degradation on public lands and national forests, and the agency's activities addressing this important issue in the broader context of our stewardship responsibilities for anadromous fishery resources in the Pacific Northwest.

The Department has statutory responsibilities which authorize it, acting through NMFS, to protect, mitigate, and enhance anadromous fishery resources for the benefit of the commercial and recreational fishing industries and Tribal fisheries of the United States. NMFS has Federal conservation and management

responsibilities for marine, estuarine, and anadromous fishery resources under various laws, including the National Environmental Policy Act (NEPA), the Clean Water Act (CWA), the Fish and Wildlife Coordination Act, the Federal Power Act, the Magnuson Fishery Conservation and Management Act, the Mitchell Act, the Pacific Northwest Electric Power Planning and Conservation Act of 1980, the Pacific Salmon Treaty Act of 1985, and the Endangered Species Act.

Now, as in the past, Pacific coast salmon and steelhead resources provide a significant economic, subsistence, cultural and recreational benefit to the people of that region. Many of these stocks are now at risk. The reasons for the declines vary by stock. For some, habitat degradation is a serious problem. Maintaining suitable spawning and rearing habitat is vital to all stocks. Past land use practices have resulted in the degradation of many miles of streams that have provided anadromous fish habitat. Much of the remaining habitat importart for anadromous fish production is on public lands. The suitability and condition of the habitat are affected not only by activities within and adjacent to, but also distant from, anadromous fish waters -- making habitat issues complex. Furthermore, available information is currently inadequate concerning the extent and significance of impacts from various human activities.

Estimates of the historical runs indicate that from 10 to 14 million adult salmon and steelhead entered the Columbia River each year. The current run size is approximately 2.5 million. Salmon and steelhead habitat in the Columbia River basin above Bonneville Dam has decreased from about 11,700 river miles before 1850 to about 7,600 miles today, a 35 percent reduction. Much of the reduction in the numbers of anadromous fish can be attributed to blocked access to habitat resulting from hydropower dams and passage losses associated with the dams. Other factors, however, were also at work.

Irrigation and flood control, as well as poor logging, grazing, and farming practices resulted in depleted streamflows, erosion, loss of riparian habitat, and a general degradation of much of the remaining habitat. Between 1936 and 1942, more than 5,000 miles of tributaries to the Columbia River were inventoried by the U.S. Bureau of Commercial Fisheries (now NMFS) for pool and substrate characteristics. These surveys were done in relatively undisturbed watersheds to document stream habitat conditions for anadromous fish before additional dams were built on the Columbia and Snake Rivers. A recent comparison of these data with current surveys shows that river systems impacted by human activities on public and private lands have lost 50 to 75 percent of their large pools during the past 50 years. Large pools are critically important for anadromous salmonids, functioning as resting areas

for adults prior to spawning, preferred rearing areas for juveniles, and refuges from drought or winter freeze-up. While the quality of spawning and rearing habitat on managed lands has diminished, anadromous fish habitat in wilderness areas remained relatively constant or improved during the same time period.

The most important of the activities which affect fish habitat are:

Timber harvest and road construction - These activities can cause loss of riparian zone vegetation, change stream temperatures and light regimes, cause loss of rearing cover due to a loss of large woody debris, reduce oxygen levels, alter stream flows and increase fine sediments in the channels. Sedimentation can lead to a loss of large pools (rearing habitat) and degradation of spawning habitat, resulting in reduced survival of eggs and fry. Improperly designed stream road crossings may limit access, resulting in the elimination of tributary habitat.

Livestock grazing - This activity may damage riparian habitats and has the potential to reduce anadromous fish production through stream bank instability and accelerated sediment production. Cattle trailing across spawning riffles may cause direct mortality of incubating eggs and alevins in the redd. Studies comparing grazed and ungrazed watersheds have shown that

fish production in ungrazed streams ranged from 2.4 to 5 times greater than grazed streams.

Mining - This activity may increase sediment transport and deposition (erosion), decrease stream flows, change stream geomorphic form, decrease vegetative cover, change pH, mobilize toxic heavy metals and increase water pollution. Some past mining activities had devastating effects on salmon and steelhead habitat, altering the streambed and leaving the channel unsuitable for anadromous fish. Areas in Idaho, such as Panther Creek, upper Southfork Clearwater River, and Bear Valley Creek still exhibit degraded habitat caused by earlier mining.

Hydropower - Proposed hydroelectric projects on public lands may reduce and adversely affect available habitat for anadromous fish as a result of blocked or limited access, inundation, water withdrawal and degradation associated with construction.

Habitat alteration for enhancement - The effectiveness of methods to enhance anadromous fish habitat is mixed. While some successes have been noted, these structures can fail, causing damage to the streambed or alteration of stream flows. Such structures include weirs, deflectors, boulder placement, cover structures, bank stabilization and the construction of side channels and ponds.

Recreation - Activities such as boating, off-road vehicles, horseback riding, and camping bring people to the streams and their banks. Effects include disturbance of spawning redds bank erosion, loss of riparian vegetation, and stream pollution.

Irrigation - Irrigation can reduce access to habitat through water diversions and diversion dams, and reduce flows in rivers or streams. Agricultural practices associated with irrigation may lead to removal of stream corridor vegetation and channelization of streams, which lead to erosion and sedimentation. This results in higher water temperatures during low flow conditions which, when combined with warmer irrigation return flows, can inhibit salmon migrations.

Silviculture - Silvicultural activities, which may include prescribed burning, as well as the application of herbicides and pesticides, have the potential to result in physical impacts to fish habitat, and also cause direct and indirect toxic effects when nontarget organisms are exposed.

Our Northwest Regional Habitat Conservation Branch reviews proposed forestry activities on Federal lands that have the potential to affect anadromous fish or their habitats, providing environmental impact statement recommendations pursuant to NEPA. These activities primarily include timber harvesting, livestock grazing and mining. We also coordinate with the U.S. Forest

Service (USFS) and National Park Service during pre-licensing consultation of Federal Energy Regulatory Commission (FERC)-regulated hydroelectric projects. NMFS also comments on U.S. Army Corps of Engineers Public Notices relating to discharges in U.S. waters pursuant to CWA, Section 404, proposed projects on public lands.

Examples of recent actions include the review of timber sales in the Willamette and Siskiyou national forests; review of proposed mining activities in the Siskiyou, Challis, Payette, and Salmon national forests; and involvement in FERC licensing actions in Olympic National Park, and Mt. Hood, Payette, Nez Perce, Clearwater, Challis, and Boise national forests.

With respect to those anadromous species most at risk, NMFS has developed an active process for involving the public in the listing and recovery process under the ESA. Following year-long biological status reviews and input by the public, NMFS determined in November 1991, that the Snake River sockeye run was endangered, and in April 1992, that Snake River fall and spring/summer chinook runs were threatened.

NMFS is currently consulting on a wide range of activities that affect species listed under the ESA. We are working closely with all relevant Federal agencies to conduct these consultations in an organized manner, addressing broad activities, where

possible, rather than individual projects. The Northwest Region of NMFS is currently conducting section 7 consultations in four major sectors that may or are likely to affect adversely the three salmon stocks that are listed under the ESA. These four sectors, referred to as the four "H's," are hydropower, harvesting, habitat, and hatcheries. The four sectors are an integral part of the economic and social structure of the Pacific Northwest. Therefore, it is essential that NMFS work with the Federal agencies responsible for managing the actions that comprise the four H's in an efficient and effective manner.

For the hydropower sector, NMFS is preparing for the 1993 consultation on the operations of the Federal Columbia River Power System. Consultation activities on the harvesting sector are also underway. NMFS is consulting with the Pacific Fisheries Management Council on ocean harvest, and has recently completed consultation with the U.S. Fish and Wildlife Service and the Bureau of Indian Affairs on Columbia River harvest. Comprehensive consultations will also be conducted in 1993 to address the hatchery sector. Even though consultations are with Federal agencies, we have included State and tribal fisheries management agencies, since they co-manage the Federal hatcheries. The States have also submitted incidental take permit applications to cover their state-run mitigation hatcheries.

With respect to the habitat sector specifically, we are working closely with the USFS and the Bureau of Land Management (BLM). We are presently working with the USFS on over 70 different actions in nine different national forests. The USFS has indicated that as many as 10,000 actions may affect listed salmon. For the BLM, actions in four districts within three States could affect salmon.

Actions from both these agencies include grazing, mining, road construction, recreation, fisheries enhancement, timber sales and salvage sales. Unless proper safeguards are taken as part of planning and implementation, these actions have the potential to severely impact the remaining habitat necessary to maintain viable anadromous fish populations. The USFS has notified us that over 200 grazing allotments require section 7 consultations. The BLM also has several hundred grazing allotments that may require consultations. In addition, numerous consultations on salvage timber sales must be completed.

NMFS has met with USFS several times to develop a more efficient process to review the thousands of actions requiring consultation. In January 1993, NMFS and USFS adopted a more comprehensive process for completing consultations. Basically, this approach will group actions by geographic area (watershed) and resource (e.g., range, timber, mining), rather than

conducting project-by-project consultations. USFS will prioritize its actions, and provide critical due dates. Also, NMFS and USFS have prepared a biological evaluation outline to help ensure that the information needed to complete consultations is submitted. We are currently working with BLM to adopt a similar approach. Once we have completed the necessary consultations with the USFS and BLM, we will have a better idea of the effect of the agencies' activities on listed species and, to a degree, other anadromous species as well.

In closing, we are focusing on the conservation of all anadromous stocks, not only on listed ones. Efforts to bring about the recovery of listed species and restore habitat can be very expensive. It is far more cost effective to prevent species from becoming endangered and to prevent habitat from being degraded. Existing authorities should be used in a more innovative manner to reconcile and integrate human needs with the conservation of natural resources and ecosystems. We need to develop better information on species and ecosystem processes to ensure that decisions are made with the full knowledge of the potential risks. Our goal, which I am sure is shared by most, is to maintain salmon and steelhead stocks as a vital resource unique to the Northwest that can be utilized and enjoyed by all.

Mr. Chairman, this concludes my testimony. I will be pleased to answer any questions you may have about our activities. Thank you.

Mr. VENTO. And finally on this panel, we invite Gary Edwards, the Assistant Director for Fisheries, U.S. Fish and Wildlife Service. Welcome, Mr. Edwards.

STATEMENT OF GARY EDWARDS

Mr. EDWARDS. Thank you. Good morning, Mr. Chairman, and members of the subcommittee. I am Gary Edwards, the Assistant Director–Fisheries. I appreciate the opportunity to appear on behalf of the Service before the committee this morning.

I will begin my testimony with two important points. First, a tremendous variety of fish and wildlife species are dependent on Pacific Northwest watersheds. My comments today, however, will focus on how watershed degradation affects salmon and steelhead populations.

Second, as has already been said, land management is but one of several factors that have caused the decline of salmon and steelhead populations in the Pacific Northwest. Irrigation, hydroelectric dams, and overharvesting have also contributed synergistically with land management practices to reduce the carrying capacity for salmon.

Sometimes even the Service's efforts to restore salmon populations have had unintended negative impacts. No one can say with certainty the direct level of contribution to salmon decline of any of these impacts.

Pacific salmon and steelhead trout are well-suited to thrive in most river basins of Alaska, British Columbia, Washington, Idaho, Oregon, and northern California. Each ecosystem component within a watershed, from ridge top to sea, plays an integral role in the production of these stocks of fish. Unfortunately, watersheds have not been managed as ecosystems.

Cumulative impacts to watersheds have gone unmeasured and unchecked as many of the multiple jurisdictions overseeing public and private land management have taken parochial approaches to managing pieces of the whole. We must begin to view watersheds as interdependent units, and focus on problem solving using integrated resource management.

Steelhead trout and all five species of salmon use streams flowing through forested areas for spawning, rearing, and adult holding purposes. Thus, the maintenance of healthy forests is an integral element in the proper management of salmon and steelhead.

Logging activities such as the construction of roads, and not the actual cutting of timber, are most responsible for increasing the sediment load into receiving streams.

In some areas, timber harvest has necessitated the building of thousands of miles of unpaved roads. High levels of sediment loading into watershed streams have resulted from improperly constructed cuts, fills, and cross drainage structures related to road building and maintenance.

The sciences of hydrology, hydraulics, and fishery biology have recently been applied together to produce fresh insights that flow maintenance is something much more than just providing a base minimum flow in a stream. In the Trinity River in northern California, the Service is conducting investigations and evaluations of year-round flow patterns that mimic the natural hydrology.

Those studies and others conclusively show that a productive stream ecosystem requires high spring flows to transport sediment, to clean spawning gravels, and rescour important side channels, which create fish rearing, spawning, and migration habitat needed throughout the year. But the most instructive message gleaned from such studies is that maintenance of fish production must begin with a multi-disciplinary approach to manage entire watersheds.

The Forest Service and BLM have made progress in the timber harvest, grazing, and mining operations under multipurpose management concepts, compared to the single-purpose schemes that prevailed in the earlier part of this century. However, private timber harvest, grazing, and farming have typically not been conducted from a multipurpose perspective and thus continue to impact fish habitat at an alarming rate. The bottom line is that we may be able to lessen the fishery impacts of land management practices on public lands but we will not protect fish habitat unless we begin to view and manage watersheds as ecosystems.

The Service is involved in multiple jurisdiction watershed restoration programs in the Klamath and Trinity river basins in California, and the Chehalis and Elwha River basins in Washington. These and other cooperative river basin restoration initiatives are helping to correct the effects of past land management practices and focus attention on the need to responsibly manage land and water resources as a first line of defense.

What is making these programs effective is the recognition among private and public entities that all parties have a stake in what others are doing throughout a given watershed.

After leaving the spawning and rearing habitat in the upper portions of watersheds, salmon and steelhead must then navigate through or around dams, through man-made reservoirs, past thriving populations of exotic predators, and past nets and fish hooks. No single challenge to salmon and steelhead survival can be viewed as the "straw that broke the camel's back." They all must be viewed as a whole or we will begin to see the extinction of stocks beginning with the upriver population such as the Snake River sockeye, currently listed as endangered, and the Sacramento River winter run chinook, currently listed as threatened.

Columbia River salmon and steelhead stocks have declined to less than 10 percent of historic levels. Salmon and steelhead production in northern California has declined from 10 million adult fish to fewer than two million. All major coastal and Puget Sound stocks have declined by 10 to 95 percent. Logging, grazing and mining on public and private lands have played a historical role in creating each of these resource crises.

Mr. Chairman, the Service is not advocating the cessation of logging, grazing, or mining in the Pacific Northwest. We recognize the need to create a balance in the management of this Nation's natural resources. We know of proven methods to minimize and mitigate many land management impacts to salmon and steelhead populations. The key is to start managing watersheds through cooperative partnerships so that undocumented cumulative impacts do not finally show up with the extinction of a fish stock.

It is time to stop viewing watersheds as short-term sources of revenue. Logging, mining, and grazing can continue to produce societal benefits on a long-term basis using environmentally sensitive methods. But we must also develop and implement management goals that recognize that fishing, hunting, and other forms of recreation are legitimate and significant revenue and job generators.

Finally, we need to retain or restore the ecological functions of watersheds that can provide millions of dollars' worth of benefits related to flood protection, water quality protection, and groundwater recharge. In the past, coal miners didn't wait to become sick before checking for a carbon monoxide problem; they used canaries as advanced indicators and then took action.

I submit to you that salmon and steelhead are economically and aesthetically valuable in their own right, but they are also canaries telling us to take action to protect the ecological and cultural integrity of the Pacific Northwest.

This concludes my formal testimony, and I will certainly be happy to answer any questions that you or the committee may have.

Mr. VENTO. Thank you, Mr. Edwards, for your statement and we will place the entire statement in the record.

[Prepared statement of Mr. Edwards follows:]

STATEMENT OF GARY EDWARDS, ASSISTANT DIRECTOR FOR FISHERIES, U.S. FISH AND WILDLIFE SERVICE, BEFORE THE HOUSE COMMITTEE ON NATURAL RESOURCES, SUBCOMMITTEE ON NATIONAL PARKS AND PUBLIC LANDS, CONCERNING WATERSHED AND FISH HABITAT DEGRADATION IN THE PACIFIC NORTHWEST

MARCH 11, 1993.

Good morning Mr. Chairman and members of the Subcommittee. I am Gary Edwards, the Assistant Director for Fisheries. I am presenting this overview testimony on behalf of the Director of the Fish and Wildlife Service.

Before I begin my testimony I want to make two very important points. First, a tremendous variety of fish and wildlife species are dependent on Pacific Northwest watersheds. The specific focus of my comments today, however, will be on how watershed degradation affects salmon and steelhead trout populations. Second, land management is but one category of the several factors that may have caused the decline of salmon and steelhead trout populations in the Pacific Northwest. Irrigation, hydroelectric dams, and overharvesting have also contributed synergistically with land management to reduce the carrying capacity for salmonids in the Pacific Northwest. For example, dams have made inaccessible to fish approximately one-third of the historic habitat in the Pacific Northwest. Sometimes even our efforts to restore fish populations have had unintended negative impacts. No one can say with certainty the direct level of contribution to salmonid decline of any of these impacts. For purposes of this hearing, however, we have been asked to focus on the aspect of forest management and its relationship to salmon in the Pacific Northwest.

Pacific salmon and steelhead trout are well-suited to thrive in most river basins of Alaska, British Columbia, Washington, Idaho, Oregon, and Northern California. Each ecosystem component within a watershed, from ridgetop to sea, plays an integral role in the production of these stocks of fish. Unfortunately, watersheds have not been managed as ecosystems. Cumulative

impacts to watersheds have gone unmeasured and unchecked as many of the multiple jurisdictions overseeing public and private land management have taken parochial approaches to managing pieces of the whole. We must begin to view watersheds as entire interdependent units, as the fish do, and focus on problem solving using integrated resource management. This means involving federal and state agencies, Tribes, and beneficiaries of our natural resources such as loggers, fishermen, farmers, rafters, and miners.

It can be argued that the most important terrestrial habitat type contributing to "salmon and steelhead" habitat is coniferous forest. Steelhead trout and all 5 species of salmon use streams flowing through forested areas for spawning, rearing, and adult holding purposes. Thus, the maintenance of healthy forests is an integral element in the proper management of salmon and steelhead trout.

Prior to the latter half of the nineteenth century, the forest communities of the Pacific Northwest were in a state of dynamic equilibrium. Natural events such as fires, landslides, and erosion have often been important processes in the forest ecosystem. When these natural processes are disrupted, or artificially accelerated, such as occurs during and after poorly managed logging operations, fish habitat is generally impacted and fish production generally decreases.

Timber harvest operations have created deviations from the normal functioning of forest ecosystems. Logging activities such as the construction of roads and skid trails, and not the actual cutting of timber, are most responsible for increasing the sediment load into receiving streams. Often those streams are unable to assimilate this increased sediment load. The result is that stream habitat quality and quantity has decreased, at least from the salmon and steelhead perspective, contributing to the decline in salmon and steelhead production in the Pacific Northwest.

In some areas, timber harvest has necessitated the building of thousands of miles of unpaved roads. High levels of sediment loading into watershed streams have resulted from improperly constructed cuts, fills, and cross drainage structures related to road building and maintenance. Even when state-of-the-art procedures were used, road construction in steep terrain has scarred watersheds, increasing sediment loading into streams for many years.

Sedimentation has impacted salmon and steelhead trout by creating a chain reaction of ecological changes. Deep pools that provided cool refuges for fish have been partially or totally filled, eliminating critical pre-spawning and over-summering habitat. Spawning riffles have been choked with fine sediment that has prevented spawning, killed eggs and prevented newly hatched juvenile fish from emerging into the water column. Sediment clogged riffles have reduced or eliminated production of aquatic insects that are an important component of the diet of salmon and steelhead.

Inappropriate timber harvest practices can change the runoff pattern in some watersheds, creating higher flood flows and lower summer base flows. Higher peak flows have changed the natural channel morphology (typically widening and incising the channel), creating severe overwintering stress on juvenile fish. At the other end of the hydrograph, reduced summer low flows in the modified channel are not adequate to maintain fish habitat during what is typically the bottleneck lifestage.

Streamside vegetation has too often been cleared during logging or grazing operations, reducing stream shading, increasing water temperatures to undesirable levels which in turn have caused dissolved oxygen levels to decline. In addition, the natural long-term recruitment of large trees and root wads into a stream has been curtailed. During the past 20 years, salmonid biologists have become aware that this "large organic debris," in appropriate amounts, is one of the most important determinants of fish

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carrying capacity in a stream as it produces pools and meanders, provides cover for fish, and serve as an important medium for the production of aquatic insects that are fed upon by salmonids.

The impacts of logging, grazing, mining, irrigation, hydropower production, and urbanization on fish habitat and fish production can be minimized by using methods such as helicopter logging, placing roads on ridgetops, outsloping road surfaces, installing and maintaining oversized culverts that prevent road washouts, maintaining undisturbed streamside buffer strips, trapping and treating mine tailing runoff, and maintaining flows. Many of these methods are "low-tech" and relatively inexpensive.

The sciences of hydrology, hydraulics, and fishery biology have recently been applied together to produce fresh insights that flow maintenance is something much more than just providing a base minimum flow in a stream. In the Trinity River in northern California, the Service is conducting long-term investigations and evaluations of year-round flow patterns that mimic the natural hydrology. Those studies and others conclusively show that a productive stream ecosystem requires high spring flows to transport sediment, to clean spawning gravels, and to re-scour important side channels -- to create the fish rearing, spawning, and migration habitat needed throughout the year. But the most instructive message gleaned from such studies is that maintenance of fish production must begin with a multi-disciplinary approach to manage entire watersheds. Even unrestricted natural flows cannot keep up with the sediment and other water quality degradation that occurs as a result of piecemeal, single disciplinary oversight of land management practices.

The U.S. Forest Service and the Bureau of Land Management have made progress in their timber harvest, grazing, and mining operations under multi-purpose management concepts, compared to the single-purpose scheme that prevailed in the earlier part of this century. However, even when the

"best management practices" are incorporated into land management operations, fish habitat continues to be impacted in steady incremental steps. Private timber harvest, grazing, and farming have typically not been conducted from a multi-purpose perspective and thus continue to impact fish habitat at an alarming rate. The bottom line is that we may be able to lessen the fishery impacts of land management practices on public lands but we will not protect fish habitat unless we begin to view and manage watersheds as ecosystems.

The Service is involved in multiple jurisdiction watershed restoration programs in the Klamath and Trinity river basins in California, and the Chehalis and Elwha river basins in Washington. These and other cooperative river basin restoration initiatives are helping to correct the effects of past land management practices and to focus attention on the need to responsibly manage land and water resources as the first line of defense. What makes these programs effective? Recognition among all private and public entities that all parties have a stake in what others are doing throughout a given watershed, and agreement among all parties to seek consensus solutions to protecting and restoring the watershed for the benefit of all and because of the presence of Federal leadership that transcends jurisdictional interests.

After leaving the spawning and rearing habitat in the upper portions of watersheds, fish must then navigate through or around dams, through man-made reservoirs, past thriving populations of exotic predators, and past nets and fish hooks. No single challenge to salmon and steelhead survival can be viewed as <u>the</u> "straw that broke the camel's back." They all must be viewed as a whole or we will begin to see the extinction of stocks beginning with upriver populations such as the Snake River sockeye, currently listed as endangered, and the Sacramento River winter run chinook, currently listed as threatened.

Columbia River salmon and steelhead stocks have declined to less than 10 percent of historic levels. More than half of the fish currently returning to the Columbia River are of hatchery origin. Salmon and steelhead trout production in northern California has declined from 10 million adult fish to fewer than 2 million. In addition, all major coastal and Puget Sound stocks have declined by 10 to 95 percent. Logging, grazing, and mining on public and private lands have played a historical role in creating each of these resource crises.

Mr. Chairman, the Service and other resource management agencies are not advocating the cessation of logging, grazing, or mining in the Pacific Northwest. We are strong fish and wildlife advocates by mandate, but we also recognize the need to create a balance in the management of this Nation's natural resources. We all know of proven methods to minimize and mitigate many land management impacts to salmon and steelhead populations. We all are helping to develop new mitigation and compensation methods. And we all know that in some cases, the best management practice is to simply preserve natural habitat conditions. But the key is to start managing entire watersheds through cooperative partnerships so that undocumented cumulative impacts do not finally show up with the extinction of a fish stock.

It's time to stop viewing watersheds as short term sources of revenue. Logging, mining and grazing can continue to produce societal benefits on a long-term basis using environmentally sensitive methods. But we must also develop and implement management goals that recognize that fishing, hunting, and other forms of recreation are legitimate and significant revenue and job generators. Finally, We need to retain or restore the ecological functions of watersheds that can provide millions of dollars worth of benefits related to flood protection, water quality protection, and groundwater recharge.

In the past, coal miners didn't wait to become sick before checking for a carbon monoxide problem; they used canaries as advance indicators and then took action. Salmon and steelhead are economically and aesthetically valuable in their own right, but they are also our canaries telling us to take action to protect the ecological and cultural integrity of the Pacific Northwest.

This concludes my formal testimony. I would be happy to answer any questions you may have.

Mr. VENTO. Mr. Leonard, in most recent years, the Forest Service and the BLM, and this is a question in turn to Mr. Penfold, has basically been required to adjust its land management plans for endangered species or for listed or threatened species.

What has the impact of that been, for instance, on forest plans as they affect watersheds, for instance? I know under the habitat conservation area plan by Dr. Thomas, that was really focused on the owl. What has been the effect of that on these other types of species that are either—we are talking about prelisting activities here mostly. Everyone is talking about that today.

Mr. LEONARD. Certainly, as a result of the northern spotted owl measures, progressively increasing measures to protect the owl, we have reduced the level of activities on those forests, particularly timber harvesting. And so to the extent there is an impact that is directly associated with timber harvesting, there has been a major reduction in the impacts over the last several years.

While the harvest levels have been held up a little bit by the volumes of timber under contract, they have dropped substantially and so the impacts have been less.

Now, because we have an evolving process to look at what we need to do for the owl, and now we are looking at the murrelet and moving very much towards an ecosystem approach, our forest plans have not kept up with that process. It doesn't make sense to revise a plan with a——

Mr. VENTO. Let me interrupt. I guess the point is how much correlation is there? You have started on the owl, now you are on the murrelet. You have these, I guess they are also indicator species or keystone species, as they say. But I mean the effect has been—there is an absolute correlation, in other words.

Mr. LEONARD. Yes.

Mr. VENTO. There is not or there——

Mr. LEONARD. There is a direct correlation between the level of activities we are carrying on out there and the areas of land that we set aside to meet the requirements of various species.

Mr. VENTO. Mr. Penfold.

Mr. PENFOLD. I absolutely agree with that. It requires more mitigation measures on grazing activities, reduced timber harvest, much stronger mitigation measures relative to timber harvest and it causes most of our plans that are not based on an ecosystem approach to be out of date.

Mr. VENTO. Of the other agencies, Mr. Edwards and Dr. Tillman, NOAA and Fish and Wildlife Service have been involved in these new planned developments, then, with an eye towards an ecosystem approach or have they specifically, by law, been limited in a sense? Especially Mr. Edwards, to the owl or to the murrelet.

Mr. EDWARDS. Mr. Chairman, it is my understanding that in many of those, the Service has been involved in the planning process. I can't give you specifics, but I don't feel that we have been excluded from the process.

Mr. LEONARD. Mr. Chairman, if I could add?

Mr. VENTO. Certainly.

Mr. LEONARD. Congressman Dicks reflected his conversations with the President and Vice President and his assurance that there

was going to be a coordination between the agencies in addressing the problems of the Northwest.

Looking at it from the perspective of somebody in the agencies, it is clear that those coordinating mechanisms are in place and that we have teams working across made up of representatives from Forest Service, BLM, Fish and Wildlife Service being assembled and at work right now both to plan for the Forestry Conference and the follow-up activities.

So there is the mechanism being in place to coordinate the activities of certainly the Federal agencies.

Mr. VENTO. Dr. Tillman, do you want to comment on that question?

Dr. TILLMAN. It is true the mechanisms are in place that we could do this. In our case, the actions are being handled by our Northwest Regional Office, and I am aware there have been staff contacts with regard to these things.

Mr. VENTO. At the 1991 salmon conference, or summit, that I think Senator Hatfield organized, the Forest Service committed to updating its allotment, its grazing allotment plans to protect salmon from livestock.

I have here a letter from Regional Forester John Lowe saying the Forest Service is backing off from this commitment.

Mr. Leonard, can you respond to Mr. Lowe's concern about the grazing update?

Mr. LEONARD. Yes, we recognize the absolute need to get on with updating those allotment management plans. However, subsequent to the salmon summit, we had the listing of a number of species of salmon, and in order to maintain ongoing operations, we have had to consult with the National Marine Fisheries Service over literally thousands of ongoing activities.

We simply had to pull some of our fisheries' biologists and wildlife biologists off of the allotment management plans to keep these ongoing programs going. What we have been successful in doing, though, is increasing the ground oversight of grazing activities, so that we are, we think that we are making some progress in ensuring that the people are, permittees are managing their wildlife on the Federal ranges in an appropriate manner.

But we absolutely have to get on with that job of getting our allotment management plans in line with the forest plans, but also with our current understanding of the requirements that we need for fisheries, which are going beyond where we——

Mr. VENTO. Obviously, new requirements would also be involved for any type of harvest, I guess. But one of the points is, the gang of four that had developed the various recommendations at the behest of the House congressional committees, the three Chairmen of Agriculture, Interior and Merchant Marine, they suggested that no roads should be built in roadless areas and key watersheds.

Do the scientists that you have with you today, have they examined that and would they comment on this recommendation from the gang of four?

Mr. LEONARD. I think they have more than examined it. They were the participants who made those recommendations.

Mr. VENTO. Okay. So they are making the recommendations and now we just have to get the Forest Service to follow it, I guess.

Dr. Sedell.

Dr. SEDELL. The gang of four recommendations for watershed and fish were basically an attempt to tie that fish part, at congressional direction, into a solution to old growth jobs and owls. So it required a widening of buffer strips.

We recommended minimizing disturbance by extended rotations in watersheds, key watersheds, that were identified.

Mr. VENTO. One-hundred-and-eighty-year rotations; is that right?

Dr. SEDELL. Right. And no new roads in roadless areas. That strategy was then more and more protection was added by layering on old growth reserves.

Under the strategy that we are working up through our Pacific fisheries management, habitat management strategy within the Forest Service, that option is one of the options being considered in terms of the eight that we are examining.

And the approach we are taking is more from a watershed processes and functions point of view, again looking at the big gang of four as one of those options. But we would be looking at trying to maintain watershed processes and functions, primarily maintaining those kinds of processes and events that shape and maintain habitat in the long-term.

We have truncated a lot of those with roads, or we have accelerated the scour or we have cleaned up and whatnot. And so it is taken from how fish habitat is created and maintained and then managing in accordance with that.

Mr. VENTO. So you obviously——

Dr. SEDELL. We would be very sensitive to the key watersheds and, obviously, you would have to know a lot about, through watershed analysis, your roadless areas.

Mr. VENTO. You agree with that, Mr. Williams? You are obviously familiar with that, too.

I am sorry I am not familiar with your work in these areas, Dr. Sedell.

Mr. Williams. Comment? The question was the recommendations for the gang of four. Do you want to add anything to what Dr. Sedell had commented concerning no roads in watershed areas specifically and roadless watershed areas?

Mr. WILLIAMS. I don't think I really have anything to add. Our western Oregon draft RMPs we currently have, I think, deal with some road closure areas. We are not as large a player in the 137 key watersheds as the Forest Service.

Mr. VENTO. You have some different problems in terms of partnership, as Mr. Penfold pointed out?

Mr. WILLIAMS. Very fragmented land management.

Mr. VENTO. Let me yield to my colleague from Utah. He still hasn't moved to Idaho, I guess. It is on his mind, though.

Mr. HANSEN. Only during the salmon run when I am fishing.

Mr. Edwards, I really appreciated your testimony, and on page 6, where you talked about the idea of a balance, it made a lot of sense to you. I think that is probably one of the best statements I have heard, when you said the Service and other resource management agencies are not advocating the cessation of logging, grazing, or mining in the Pacific Northwest. We are strong fish and wildlife advocates and, by mandate, but we also recognize the need

to create a balance in the management of this Nation's natural resources.

I honestly think that hits it right on the head. The question is always, like beauty, it is in the eye of the beholder, and what constitutes balance, as we hear from people here, a lot of people feel their own particular thing on either side of the spectrum may be the balance.

Here is the question I really want to address: I think Norm Dicks gave an outstanding statement this morning when he was talking about some of the ways that he looked at what was going to happen in the Northwest. And then as we got into the conversation following that, he made a point about the idea that he felt that we should not list one by one on the Endangered Species Act, as has been the pattern, but that we should go to a more ecosystem approach, where each State should participate in what they think is right.

I pointed out to him that would cause a change in the particular act as it now is, if we were going to go to that and, in fact, a rather dramatic change in it. What would be your comment on that?

Mr. EDWARDS. Mr. Chairman, Congressman Hansen, I am certainly not an expert on the Endangered Species Act, but I guess I would agree with the statement that we need to take a broader approach. I do think there are some provisions under the act, under habitat conservation plans that does allow us to take a look at this from an ecosystem approach. And I think in the State of California, for example, I think there are places where that has been implemented.

Other than that, I am not sure that I can really address your question.

Mr. HANSEN. Does it make sense to you? Do you find yourself in a position where a certain endangered species is listed and then the heartache that goes along with that—I imagine from your department you see it more than probably the other folks do—the desert tortoise in Southern California, the red squirrel in California, the squawfish in Colorado, on down the line, the spotted owl up in the Northwest.

Immediately, the media is full of things. We have lost 300,000 jobs, or we are going to—the price of homes are going up and all that sort of thing. Doesn't it seem to you we are creating a lot of problems? And maybe Norm Dicks' idea would be a better idea, to maybe see how to examine it and how it affects the entire particular area?

Mr. EDWARDS. I think at times the Endangered Species Act has been compared to an Intensive Care Unit, where we bring the patient when he is on his dying last gasp. And I think we all know that not only is that an expensive proposition, but also it is frustrating to the people involved with the patient on either side of the House.

I think the trick is, as you and Mr. Dicks have said, we need to take a proactive approach. We need to get in front of these issues and address them now in some kind of cooperative partnership approach so we don't have the patient there.

We have heard a lot in the last couple of weeks about national health care, and the idea, I think, is preventive medicine, and that

is what we need to be looking at when it comes to these species, and particularly our fisheries species. We need to take action now. But we also have to recognize, in the case of fisheries, many of these fisheries are very valuable, both socially and economically, to this Nation.

Sometimes I get disturbed that we seem to think when we provide water for fish that somehow the fish are going to use the water and, therefore, it can't provide other benefits. But certainly the fish themselves provide an awful lot of values.

I would refer to California. If we would just carry out our current plan, that the State developed to try to increase salmon levels by just 50 percent of recent levels, not even historical levels, that is worth some $190 million annually to the economy of the State. If we could get salmon and steelhead back in some of these little communities, the potential there for economic growth for those communities would be tremendous.

So I think we have to look at all of that when we look at our balanced approach. But the key is, as you have said, and certainly as Mr. Dicks said, we have to try to get out in front and take a proactice approach.

Mr. HANSEN. But we don't take the intensive care patient and put him all over the city; we put him just in the hospital. We don't make him affect the rest of the city and bog down our transportation and everything else we do.

I appreciate your comments.

Mr. Penfold, would you like to respond to the same question I asked Mr. Edwards?

Mr. PENFOLD. Well, let me say, first, we are going to follow the law in BLM. Second, we are working very aggressively on how you implement ecosystem management. My personal feeling is that that is the road we need to go on, and we understand the concepts of it. But between ourselves and government and the private sector, we are not doing a good job of that right now.

That is what we must do. We need the help of Congress and the private sector and cooperation amongst government agencies to make this happen, but that is the road we need to get on as promptly as we can.

Mr. HANSEN. Is there any private interpretation of the law?

Mr. PENFOLD. Pardon?

Mr. HANSEN. Is there any private interpretation of the law that you are going to follow?

Mr. PENFOLD. I am sorry, I don't understand.

Mr. HANSEN. Well, laws come out and we have courts that adjudicate how the law is to be interpreted. I have heard four conflicts here this morning on the same law. I wonder which one you are going to follow.

Mr. PENFOLD. Let me say that——

Mr. HANSEN. I don't mean to be facetious. I am just saying I see different organizations——

Mr. PENFOLD. We will put the best program forward. We are going to consult with the Fish and Wildlife Service, the National Marine Fisheries Service, relative to our programs and as they affect fish, and we are going to make adjustments to those programs as the law requires us to do.

Mr. HANSEN. Thank you. I appreciate that. I wasn't trying to pin you down. I was just saying I sometimes look at different agencies, in the way they interpret the law, and it is sometimes different than the way it was written.

In the States' legislative bodies they have something called the legislative intent. And when I was Speaker of the Utah House, I got so tired of being sued. I was sued every day because that is who you sue on a law. We would go over there and the court would say, what did you intend, because it is being interpreted differently by the regulatory agency.

Around here, we do report language, which is supposed to say this is what we mean by this. It probably is pretty meaningless—I don't mean that the way it was said—but whenever I hear someone say I will follow the law, I can understand that. But beyond that, I get a little confused about the way you folks interpret it.

Mr. PENFOLD. And I have to admit we have had some people challenge us on how we have interpreted the law, too.

Mr. HANSEN. Sure.

Mr. Leonard, would you like to respond to my comment? I asked Mr. Edwards about the comment of what Congressman Dicks said before he left about the ecosystem rather than the listing one by one.

Mr. LEONARD. We think definitely the only way to successfully maintain species is to deal with them on an ecosystem basis. In fact, if you look at the preamble of the Endangered Species Act, the authors felt that same way, too. It is when you get into the details of the thing you begin to get away from that general concept and get into the species-by-species, I think. That is the only way you can deal with most of these species.

And, in particular, the ones that we have been talking about here recently—the marbled murrelet, owls and things—those simply are a function of the health of the entire ecosystem and the structures that are there.

You have some other situations, for example, down in the San Bernardino Mountains, near your district, Mr. Calvert, where we have got some plants that grow almost exclusively at that point on limestone formations. And those limestone formations are mining claims being developed because they are a particular type of limestone.

Well, you get away from an ecosystem question there when you get to a species, particularly a plant that has just a narrow requirement, that it is found on one side of one mountain in one location. So I think we are still going to have some situations like that, but of the species that have been of interest and the ones that truly impact the economies of the area, there I think you truly do have to deal with it on an ecosystems basis.

Mr. HANSEN. The statements made by the three of you are very progressive and you make an awful lot of sense. I hope I can quote all three of you when we do the reauthorization of the act.

Mr. VENTO. New category of endangered ecosystems. Hansen will propose.

Mr. HANSEN. I don't want to do away with these things. They are all part and parcel of the things we do and I would compliment you

on the great work you do, but the extreme application of these things is what worries some of us.

Thank you, Mr. Chairman. I have another committee to run to.

Mr. VENTO. I will have another round here, but I know, Mr. Hansen and Mr. Calvert, I expect we may have a vote.

Mr. HANSEN. I expect we will, too. Thank you. I appreciate the opportunity to respond.

Mr. VENTO. Thank you, Jim.

Mr. Calvert.

Mr. CALVERT. Thank you, Mr. Chairman.

Certainly, the Endangered Species Act, while we are on this subject, is of great importance in California, since I believe we have more endangered species than any other State and have more species that are on the threatened list and coming up toward the endangered category.

As some of you may be aware, our area was one of the first areas to get involved in species habitat formation and getting into multispecies habitat planning. It has been very difficult working with various Federal agencies. I believe the interpretation of the law does not allow us to do that at the present time.

Going to my question. We have noticed that, for instance, in one particular species in our area, the population of the Stevens kangaroo rat has spiked significantly in the last couple of years because of the drought that has, happily, come to an end in California.

Do you perceive that this drought was a major affect on the salmon population in the Pacific Northwest, and do you believe that the population in the short-run will significantly increase because of the drought ending?

I would, I guess, direct that question to Dr. Tillman.

Dr. TILLMAN. Yes, there is no doubt the drought was a significant factor in the listing of the various salmon species. As far as the time frame, we are still reaping the benefits of that problem because of the other four- or five-year life cycle. So we won't be able to see any improvements that may come because of the end of the drought for another three, four, or five years.

Mr. CALVERT. I guess the question would be, as I was looking through testimony on population, historic population on salmon over the years, I looked back 100 years ago and saw the salmon run was approximately 14,000,000. It has dropped to 2.5 million.

The historic trend on salmon populations after periods of drought, what would be the typical drop in population of salmon after a long period of drought?

Dr. TILLMAN. I am not aware of any information that would give you that figure. All I can say is there have been previous droughts in the history, recent history. In the 1950s there were droughts, and there was recovery of some small magnitude after that. But nonetheless, the downward trends continued through time to where we are now.

Mr. CALVERT. The other question on predatory fish, and I guess I am getting to the nub of the issue, which would be in relationship to various industries, and I think we all agree we need to do a better job in managing our timber industry and our mining and grazing activities in the Pacific Northwest. But the drought and the ad-

vent of predatory fish into the Pacific Northwest, has this had more of an effect on the populations than in other areas?

Dr. TILLMAN. It is a factor in some of these rivers which have dams on them. It is clear predators are feeding on the downstream migrants of salmon and steelhead trout, but that is only one of the factors. I wouldn't exactly consider it a major factor. These other factors, the four H's, as we call them, are the primary problem areas.

Mr. CALVERT. And you believe that those are the significant problems that have more importance than the drought and of the predatory fish, and even the advent of the species, especially mammal marine species, whose populations have managed to increase dramatically over the last several years?

Dr. TILLMAN. Right. Looking at all of these river systems, over the long haul, the long-term, the major factors are those four, the hatcheries, the habitat degradation, the hydropower developments, and so on.

The drought is an act of God, if you will, that has come along and exacerbated the effects of these other factors. It is not the major effect. It has had an impact, yes, but over the long trend of these stocks, it is these other factors which have been the most important ones.

Mr. CALVERT. Do you think it would be helpful—you mentioned apparently there has not been any study to look at the drop of populations, of the salmon population, if there is any way to do this over recent history—I know you couldn't in the past—to look at the drop of population of salmon after a period of drought to see what the percentage drop in populations would be?

Dr. TILLMAN. I am sure there is information available on that, on what recoveries were experienced after drought periods. I have not reviewed that myself.

Mr. Iadanza is with me. Perhaps he knows something about that.

Mr. VENTO. Would you give your name for the record, please?

Mr. IADANZA. Yes, my name is Nicholas Iadanza, Chief of the Habitat Conservation Branch out of Portland. I can take a stab at your question.

There have been some pretty significant drought occurrences in the Pacific Northwest over the past couple of years. 1972 was a pretty bad year as was 1977. We did see some drop in population then. But since you have multiple year classes of fish, there is usually some compensating mechanism there. And there have been fluctuations up and down. But I think in general, over the past 30 years, there has been a declining trend regardless of the fact whether there have been drought years and then good water years.

There are compensatory mechanisms that occur at times of drought. Sometimes you have fewer fish coming down, making it down the river because of drought; you have the rearing habitat which has been limited; the spawning habitat has been limited, but there is potential for more juveniles to survive when they come to the estuary.

So I think the basic response to your comment is the fact that even though there have been droughts and there are fluctuations in populations, the historic trend is showing there is a downward trend in salmon populations.

Mr. CALVERT. The point I think I am attempting to make is that certainly certain commercial interests, the mining interests, the timber interests, the grazing activities that take place have had an effect. I think we know that from the testimony. But also the drought has had a significant effect, I believe, in the populations of salmon, and also predatory fish and the advent of marine mammals, which have had a dramatic increase in population over the past several years.

And so when we move forward on this, I would hope that we are not too anxious to recognize the importance of the other interests that are involved in the Pacific Northwest.

And with that, Mr. Chairman, thank you very much.

Mr. VENTO. You still have time. I was going to say, sometimes ecologists have referred to the factor that is key, in terms of a population, as a limiting factor, and they look at that as being a threshold issue, and that there are certain background events—environment—that are within the range of weather and phenomenon.

Clearly, in this case, I think the issue of having 100 years of documentation is difficult. In fact, I think I will probably suggest they would need a lot more money if we are going to document and keep all the data records. But I think looking at the question Mr. Calvert asks, is really a question I anticipated in trying to bring out the fact there is not enough research, and there is not the 100 years of information we probably, or 200 years of information, we would like on salmon populations, so we have to operate on the information we have. And, hopefully, we will come to a policy that has balance in that sense.

But I think the key here is that if the scientists here, or others, could just state for us what the limiting factors are with regard to salmon populations that are key, and if it is weather, if it is drought, you know, and so forth, then I think we have to know. If it is predatory species, if it is the temperatures of the streams due to low water flow and so forth, and/or to the surrounding, the lack of benthic organisms, the midges, the mayflies, and so forth, the caddis flies and things they feed on.

So I think we have to know that in order to be able to have a halfway intelligent policy—the best policy—in terms of law.

Mr. LEONARD. Mr. Chairman, if I could, Dr. Sedell, pointed out to me that the nature of the degradation on some of the streams on the public lands probably has made these streams more vulnerable to the drought circumstances. Because as the comparison of the measurements made in the 1930s and 1940s to recent measures have shown the pools are fewer and they are smaller and they are shallower.

And so that when you have less flow through them during a drought period, the tendency to warm up and go past critical temperatures is going to be greater. So that as you have had this degradation, your ability to withstand the normal cycle of droughts has been reduced.

Mr. VENTO. Other limiting factors? I guess Dr. Tillman wants a chance to make a comment.

Mr. TILLMAN. Yes, sir, just to respond to one point about the impact of the drought. I want to raise the fact that the American Fisheries Society was very concerned about the plight of these

stocks in the Pacific Northwest and all along the West Coast, indeed well before there was a drought.

In the 1970s and early 1980s, they were very much on the backs of the National Marine Fisheries Service to try to do something about that. In fact, it is my understanding that the Congress reacted and passed the Pacific Northwest Electric Power Planning and Conservation Act in 1980 to try to address some of these concerns, and the goal of that act was to try to prevent us from getting to the state where we had to list some of these endangered species, and the problem is that for whatever reasons, we failed to do that.

So as Mr. Dicks said this morning, there is no sense finger pointing but rather to look at how do we arrive at solutions. And certainly we would agree that looking at things on a watershed basis and ecosystem basis is an appropriate way to go to solve these problems and prevent us from having to put more species on the endangered species list.

Mr. VENTO. Well, I am making an assumption that the reason you are all talking about habitat and land management is we asked you to talk about that, but also there is a presumption that this is an essential limiting factor; that the land management practices—yes, Mr. Edwards.

Mr. EDWARDS. Mr. Chairman, as I said in my opening statement, I don't think there really is a silver bullet. I think it varies from what part of the ecosystem you are talking about.

Certainly on the Columbia River, where you have four dams on the Snake River that are taking 15 percent of the Salmon smolts at each dam, or the Grand Coulee Dam, which has eliminated forever thousands of miles of habitats, one could argue that fish passage and dams have more impact, and then these other things have added to it as we get into some of our coastal stocks where hydroelectric does play a bigger factor, but other things such as land management practices and all play a factor in that.

But I don't think we can sit back and specifically identify any one thing. It has been a cumulative effect. You have to look at each of these systems entirely from a holistic approach if you are going to apply your problem solving process to try to address the issue.

Mr. VENTO. Well, I might as well hit a home run on my limiting factor question. Mr. Williams.

Mr. WILLIAMS. Mr. Chairman, I would like to add, if I could, that it is an important point to recall that as the health of these systems, both as the health of the particular stocks and the health of the watersheds decline, that they do become more vulnerable to these types of droughts and floods and El Nino events and lose their resiliency.

So, for example, as to the winter run chinook salmon in the Sacramento River, the effects of the drought on that population, which recently crashed to near just a couple of thousand spawning adults, may indeed have been sort of the straw that broke the camel's back as compared to the historic ability of that run to have a much higher resiliency and be much less impacted by droughts and floods and these sorts of things.

Mr. CALVERT. Again, I would state that I understand that there is some excesses that need to be corrected, but on the other hand, there are other factors beyond the mining industry, the timber in-

dustry, and grazing industry that we seemed to spend a lot of our time on this morning versus the drought and versus predatory species and marine mammals that are feeding on the various endangered species, that there are other factors.

I hope in the quest to find an equitable solution, we don't sacrifice on the alter of the Endangered Species Act very important industries in the Pacific Northwest.

Mr. VENTO. No, I think the concern is that the normal environment is not something we can legislate on but we can legislate on the other issues that impact.

We have to vote. We will be back for further questions of this panel in a moment.

[Recess.]

Mr. VENTO. The committee will try and resume its sitting. I know that it is a small room, and I appreciate the cooperation and apologize for any inconvenience. But we do want to maintain order.

One of the problems is in terms of the agreements that you made, or commitments, at the Salmon Summit. And did BLM make similar commitments, Mr. Penfold?

Mr. PENFOLD. Yes, we did. And as I stated in our testimony, we are committed to making those commitments and adjustments in our grazing plans. We have had a temporary impact of the consultation process in preparing the documents and getting our information together for consultation.

Mr. VENTO. I guess the bottom line in terms of land management changes, you know, putting aside the other factors, I guess one of the predators could be math, I guess, they are talking about seals, I gather. But the point is that you think that these actions, in terms of new requirements and grazing permits, are relevant to the maintenance of the salmonid populations and to get out front of the listing of these species.

Mr. PENFOLD. Very relevant.

Mr. VENTO. I think that's the key. If we enter an area, I suppose, of public policy, that someone were to suggest that, you know, there is a questionable validity in terms of these particular actions to maintaining these hundreds of populations of salmonid that could be listed, then we should be more concerned; but insofar as the actions are relevant.

And of course it does follow that many of these deal with mining. I think that all of us understand the deterioration of siltation, the loss of habitat. And I guess there is a new understanding about the dynamics of these salmon streams and steelhead streams in terms of what needs to be and how they need to be maintained.

I note, you pointed out in your testimony, most of the witnesses, the tremendous resiliency of the species to put up with a certain amounts of adversities or stress. But when you exceed that stress—and it is being exceeded—that these species are under stress. And then when you have something like an additional loss of water, then it carries over into the loss of the species; is that correct, Dr. Sedell?

Dr. SEDELL. Yes.

Mr. VENTO. I didn't hear anyone use that word, "stress."

Dr. SEDELL. I wouldn't have necessarily used that, but yes, there is no question that through a whole combination of factors, hatch-

eries, hydro, and harvest combined with habitats, species just don't have the resilience to weather big extremes that we know we are going to hit: floods, droughts, volcanoes, or forest fires. All of those disturbances, events, are going to go on. And we have been managing for that kind of instance that we cannot predict.

Mr. VENTO. We cannot legislate it away, either. Although some may suggest we can. So we really face a sort of a changed menu of what the reactions or actions are, for instance, with the grazing permits and new requirements for watershed protection. It may make it uneconomic. We understand that. It may make it uneconomic. But I hope that is not the case for the permitting to function.

And we especially have, of course, an opportunity this year dealing with that matter in terms of the administration's recommendation for modification of the fees and hopefully being able to put a positive orientation on that in terms of what steps could be taken and what steps are taken in terms of crediting permitees for reduced fee on the basis of that activity, I might add to those on the panel and present today.

One of the other aspects, of course, is road building. We talk about different kinds of harvest of timber, but this is very critical because road building or surfacing may, in fact, result in the timber sale, in a sense, if it is a cost to the Forest Service in the terms of increasing or enhancing that road as being a deficit timber sale, which trips over to some other problems.

Mr. Leonard or Mr. Penfold, can you talk to the costs associated with that and the importance? We are not just talking here about not necessarily building new roads, but going back and maintaining existing roads as well.

Mr. LEONARD. I will start and say that, you know, in a sense, the cost is irrelevant in that we are not going to build roads unless we feel that we can meet the requirements of good stewardship to the land.

Now, our perception of what that is has changed substantially over time, and our standards for surfacing, for culverts, and all have evolved as our understanding has changed.

The real problem that we, frankly, have as our timber harvests have dropped and we have major parts of the road system which will only have minor timber harvesting or no timber harvesting in the long-term, our abilities to utilize the timber values through appraisal adjustments and what not, to get maintenance of those road systems is declining very rapidly; and we are not getting other alternative ways to do those. So we have got a big road system without the capability of maintaining it to the standards that we need to be sure that culverts don't fail; that surfacing is maintained adequately.

So we have a major problem with the existing road system out there.

Mr. PENFOLD. Just briefly, this is same situation we face with our checkerboard pattern out there. Most of the areas that we manage are eroded. Where we need new roads we have learned from mistakes of the past how to do that and design them so that the stream zones and watersheds are protected. The challenge that we

have is that a lot of the old roads that are out there that need to be closed and put to bed are going to be left opened.

Mr. VENTO. Mr. Penfold, as long as I have got your attention, one of the aspects that you raise—and I think it is important, especially in the OSC lands—was the issue of acquisition and the acquisition program to consolidate some land holdings.

We asked, at times, for loss studies on that particular—the consolidation of land. But you also raise the points of acquisition in some instances.

What is the status of the acquisition programs in Oregon and Washington?

Mr. PENFOLD. I am going to ask Mr. Kaufman to give you an overview of what we called for in our plans.

Mr. VENTO. Mr. Kaufman, yes.

Mr. KAUFMAN. Thank you Mr. Chairman. I am Ron Kaufman, District Manager.

We in Eugene, right now, are looking at some key areas to do some land exchanges to develop, particularly on our Lake Creek Basin, an approach to improve the anadromous fisheries program.

In general, we have created plans for lands in western Oregon, one of the areas where management of those lands is made extremely difficult by the checkerboard pattern. Another way of looking at it is that by having this pattern we can influence the ecological health of much greater pieces of real estate in western Oregon.

So while we are looking at opportunities to do land exchanges and other measures, such as our acquisition of the west Eugene wetlands property, by and large we see, long-term, that the checkerboard pattern will largely stay intact; and our plans that we are creating don't anticipate any major shift in that effort.

Mr. VENTO. Mr. Leonard, do you think the acquisition program that you have in effect would not probably be as ambitious or present the same problems as BLM? Do you want to comment on it?

Mr. LEONARD. We have, certainly, the same kinds of problems in the Bureau of Land Management on many of our National Forests. We have a checkerboard pattern on a lot of the National Forests in the West along the Central Pacific, Southern Pacific, Northern Pacific.

Mr. VENTO. You have a pattern of State's land, too, do you not, in northwestern Oregon?

Mr. LEONARD. That's right. We have a very active land exchange program. And we have been successful in some areas blocking up the public ownerships. We have had a significant program—strongly supported by this committee, I will note—for expenditure of land and water conservation money. Much of that has been directed toward solving the problems of endangered species habitat.

Mr. VENTO. I was pleased with Mr. Woodard with his BLM state director, I might say, Mr. Leonard, with his programs in terms of riparian areas. But it seems that he had an aggressive program in spite of local concerns about buying the riparian areas. I want to give credit where I can.

Mr. LEONARD. Thank you. I appreciate that.

Mr. VENTO. I see that my colleague from Oregon has arrived. Mr. DeFazio.

Mr. DEFAZIO. Thank you, Mr. Chairman. The unfortunate sort of imperative around here is that I have not figured out how to be at several places at one time. And this committee has a predilection to putting issues in which I have a vital interest in several areas at the same time. The Secretary of Interior was testifying on mining reform, and I had several questions that I wanted to put to him.

I had one particular and immediate concern, which I understand the Chairman raised, but I would like to pursue it a bit more with Mr. Leonard, which had to do with the recent revelations that we were not moving ahead on the grazing reallocation or allotment in some sensitive areas of Oregon as I had understood.

And I was distressed that it was brought to my attention in the press and I had never seen the communication nor had my staff from the Forest Service, despite the fact that I had worked with Senator Hatfield, and others to get the allocation of funds for the Forest Service.

I understand that part of the reason is having to deal with consultation on other pressing environmental issues with the National Fishery Service, and I understand that. But I guess what I want to do is make a point and then ask Mr. Leonard to respond, and that is these are both imperatives; and I know you have many imperatives. But what I would hope, under the new administration, is that we could hear, honestly, from the Forest Service in terms of its needs. It is something that I feel the managers were not allowed to do under the last administration. OMB dictated that, you know, you were not basically allowed to honestly voice the true needs of the agency. I hope this administration is different.

And if it is not different, I would like to know that, too.

And if there is a need now, if the consultation is not complete and you need more resources or if the consultation is complete, if you would immediately reassign those resources. It is an imperative that we continue along the track of reallocating and revising those grazing allotments to stop the degradation in those critical areas.

And I would ask, Mr. Leonard, given your original time line, where are you at now and how do you expect to deal with this?

Mr. LEONARD. As you have indicated, the problem that we got into was the reallocation of grazing sources. We had, probably, 10,000 ongoing activities in the Forest Service that were affected. We had to go back to the National Marine Fisheries to consult with them.

For a large share of those, 6,000 or more, at least the biological evaluations and the supporting work is done, and we are in the consultation process on those. Most of the biological evaluations and what not have been done to support the completion of them, and we are in consultation on the rest.

It is my understanding that we are at the point where those people can now move back and get on with the important job of doing the assessments. I am going to be out in the Northwest next week, and I will talk to the Regional Forester; and if that's not true, that we are not going to be able to get on course, I will get back to you.

Mr. DEFAZIO. I appreciate it. I think I can speak frankly and fully with my friend Mr. Panetta and former colleague. And I think

that we can impress upon the administration that these are areas of investment that are needed to avoid other public costs and advocate strongly for you.

Another question, and I don't know who would most appropriately address it on the panel. But if I could, Mr. Chairman, we are going to hear from Mr. Doppelt who represents Pacific Rivers Council, and I would like to get a response in advance of that. They have taken a contrary—I guess contrary is not the right word—but a different view of restoration, watershed restoration.

And the point that they make is that we have all got limited resources, the needs are great; but we should first deal with ensuring that those areas that are still pristine, relatively pristine, or productive are protected against degradation. That may require not only enhanced riparian protections but also require some investment in terms of removing a problem or potential problem roads or other activities that have gone on in proximity to some of these still pristine and productive areas. And then we work down or backwards and finally get to those areas that are most blown out or degraded or relatively spoiled.

My understanding or reading of the existing strategy of the agency is more that we begin the restoration activities in those areas that are most spoiled and would work the other way.

And I would like any member of the panel who would like to respond to that rather simplistic view of the position of the government. And I am told that I should ask—particularly since I have not been here and I am not full integrated in this—Dr. Swanson's thoughts on the Pacific Rivers program; there he is. And then any other members of the panel.

Mr. SWANSON. I believe you could look at the Gang of Four Report and other activities that are now under way as indicating that the Forest Service is attentive to identifying the best basins and giving them an extra measure of attention.

I guess I would ask Jim Sedell or George Leonard to comment further on that. But I would say that the Forest Service's approach is not necessarily one of going from the worst to the best. But some activity is dispersed across the range of conditions.

Mr. DEFAZIO. Would anyone else like to respond?

Mr. LEONARD. Mr. DeFazio, in my prepared statement, I say that we will assign priorities to watersheds that are in good condition. I don't think it needs to be an absolute priority though because some of the stocks most at risk are found only in those habitats that are degraded, and it would be a shame if we let them go away because we didn't take some timely actions there. So I think we have got the resources to do both.

Mr. DEFAZIO. Okay. I just want to be certain that there is some awareness. Is there some other?

Mr. WILLIAMS. Mr. DeFazio, I would like to comment that I think the Pacific Rivers philosophy, in terms of restoration, is reflecting growing consensus in the scientific community and within the agencies in terms of a change in approach to fisheries restoration, moving from the in-stream work to the more proactive watershed phases. Not that I think that necessarily means a complete abandonment of in-stream work, but certainly there needs to be a prerequisite or reliance on overall changes in terms of land manage-

ment. And I think that we are in pretty complete agreement with Pacific Rivers in those areas.

Mr. DEFAZIO. Okay. And if I could put one final question? This has to do with looking a little longer term. And I know that things are okay on the short term that perhaps it is hard to look at the long term; and we have not completed the last cycle of the planning process.

But in legislation I proposed last year, I looked at one of the longer-term objectives, in my mind, of determining appropriate activities on Federal lands in the future in planning to, essentially, discard, some of our historic boundaries.

That is, we drew up forest boundary, ranger districts, depending on an archaic standard. You couldn't get over this ridge to that area, historically; but we didn't accumulate these on a biological or ecological basis. And my idea would be that when we finally move forward again with the next cycle of the planning process that we can look at reaggregating our planning and doing it on a cumulative watershed basis as opposed to a geographic basis ranger district by ranger district.

Mr. PENFOLD. Mr. DeFazio, you have completely the right idea.

Mr. DEFAZIO. I appreciate that. You are invited back any time.

Mr. LEONARD. We are going to have to deal on all kinds of scales. We have issues that transcend many watersheds. The owl issue: You cannot deal with one watershed on the owl issue.

But it is absolutely true that our existing forest boundaries are not tied to ecosystems management on any scale, and we have got to get that in line.

As you are aware of, there is some real impediments in terms of payments and what not that make it difficult to change administrative boundaries. I think we need to pay attention, though, to planning for the resource as opposed to planning by administrative boundary. Maybe we can address that without having to address the administrative boundary problem.

Mr. DEFAZIO. In fact, in reflection on this, I haven't yet had this discussion with the Secretary of Agriculture; but I have had the discussion with the Secretary of Interior and some of his staff. And they showed a willingness to begin to look at a more coordinated planning approach.

In part, we are in deep trouble in the courts because BLM went this way and the Forest Service said we have a great plan here, but it depended on the BLM going this way.

The BLM went that way, and the judge had a fit, and we ended up under injunction. I think that area, for the next four years, hopefully eight, has come to an end; and I would look forward to working with you folks in the Forest Service identifying where there are statutory barriers and dealing with those.

Mr. VENTO. In fact, I had a question to follow up. It is just the two of us here; but on planning, I would be happy to yield further time to the gentleman from Oregon, because the Forest Service today, in their statement, talked about a strategy, and the BLM talked about Resource Management Plans. And I would just like to know how that is satisfying this particular strategy. Is it done? Does it satisfy protecting the salmonid habitat and the role in the reversal, in the decline of these populations?

I have been referenced here that an internal Forest Service analysis of Forest Service plans in the Pacific Northwest estimates that these plans do not contain the specifics necessary to determine whether or not long-term viability of selected fish stocks is ensured.

And I raise it because, obviously, the purpose of this is on these fish stock populations but also, because I think, in a broader sense, we are dealing with hundreds of species. And so I am interested in that and why it does not contain the specifics necessary to determine or to ensure, Mr. Leonard—then I want to go to Mr. Penfold with basically the same question—combining two things, strategy, and the satisfactory status of the forest, the Resource Management Plans of both the agencies. And why doesn't it do that?

Mr. LEONARD. Our existing plans are deficient. They really reflected our understanding of the fishery resource as it existed about 10 or 12 years ago, and our approaches to planning. And we have made tremendous strides over this last decade in our understanding of what is required. And the relationship of the ecosystem to the aquatic portion of that ecosystem.

We are just in the process of developing our Pac-fish strategy, which is to expand it beyond paying attention just to the Columbia River system to the entire anadromous fish areas, a problem on the west coast. And it is certainly our expectation that that will provide a strategy for getting habitats up to support restoration of the fisheries, including recovery of the listed species insofar as habitat is the factor that is involved.

Mr. VENTO. The strategy is a broader basis than you have specifically applied in the Resource Management Plans?

Mr. LEONARD. An essential part of that strategy is the idea of watershed analysis in which you develop a specific strategy for a specific watershed based on what's there, rather than a cookie cutter approach that was laid down over the whole system, which may be appropriate on average but inappropriate as applied.

Defining watersheds, and then doing an intense analysis there to develop prescription standards for activities and identification of what restoration activities are needed in that particular watershed.

Mr. VENTO. This brings more questions. Time frame?

Mr. LEONARD. This is an ongoing thing we hope to complete this year. But all these ideas and concepts are now being brought to the table as part of the Forestry Conference in the Northwest and the followup.

So my expectation, frankly, at this point, is that these strategies for this and owls and the murrlets are going to be folded together to truly deal with it on an ecosystems basis.

Mr. VENTO. I think we would feel more comfortable if we know that it's been worked ahead. As I said, we can do good things based on the work that is behind it.

Mr. LEONARD. Well, I will say this, that people like Dr. Sedell and Dr. Swanson are going to be part of the task force, the interagency task force that is currently being put together to move from the actual event there on April 2nd, to a proposed ecosystem approach to dealing with it.

Mr. VENTO. Let me go to Mr. Penfold.

Mr. PENFOLD. The American Rivers review of our plans indicated that they are deficient relative to that concern. We worked hard in

the Department of Resource Management Plans to strengthen them. We have public comments that we are evaluating now to see how these draft plans can be strengthened. We are working with the U.S. Forest Service on strategic plans much in the vision that Mr. DeFazio indicated, to provide a more comprehensive umbrella and direction for our planning activities on these critical watersheds.

Mr. VENTO. Mr. Penfold, you are in the same cycle and the same umbrella in terms of looking to resolution in the interagency or interagency groups that are working, and we are bringing this to the table as we attempt to craft a final policy for, I guess, this western slope or at least a policy for the 1990s for this slope, western slope forests.

Does it fit within the recommendations of the Gang of Four? I mean this is more specific, if I understand. I hope that it is more specific than the Gang of Four recommendation; but does it fit within the parameters of what they are suggesting we do in terms of watersheds?

Mr. PENFOLD. What I think we are going to see is, at the Forest Conference, we will be taking a comprehensive look, with all the agencies, including Fish and Wildlife Service, Forest Service, and BLM scientists, at all of the different planning documents and reports that have been produced so far.

Mr. VENTO. What I am suggesting is that, for instance, they are talking about the rotation lengths, and they are talking about other factors within that area. This is more specific in terms of how it could be applied within that framework; is that correct?

Mr. PENFOLD. What you can expect to see is carefully coordinated, final recommendations coming out of that forest conference.

Mr. VENTO. How about you? Do you want to attach yourself to the Gang of Four, Mr. Leonard, or avoid it?

Mr. LEONARD. The Gang of Four didn't specifically make any recommendations. They came up with a series of alternatives, and I think the solution that is going to come up is within there and correlated.

Mr. VENTO. I didn't say that anyone is making decisions. You don't make any decisions either. I guess we hope you will make some.

Mr. LEONARD. Particularly in the fisheries area. The scientists that had the input into the Gang of Four are very much——

Mr. VENTO. I wanted you to say, yes, it correlates. That's what I wanted you to say.

Mr. LEONARD. It correlates.

Mr. VENTO. Mr. Penfold still hasn't said that.

Mr. DEFAZIO. Just to follow up with Mr. Leonard and the Pac-fish, I am curious, the Gang of Four, the American Fisheries Society Review, certified 137 key watersheds; in varying degrees of importance, but being key generally. Is Pac-fish reviewing on those same terms? Do you accept those 137 watersheds?

And what are you doing in reviewing those with Pac-fish, I guess is my question?

Mr. LEONARD. Let me ask Dr. Sedell.

Dr. SEDELL. Those have been reevaluated in the case of California. Some of those have been added; some have been dropped. We

added eastern Oregon, Washington, Idaho; and we are doing the same effort looking at Alaska.

Mr. DEFAZIO. And what will Pac-fish result in? Will they be put into categories, priority, rank, or otherwise commented upon? Or what are you developing?

Dr. SEDELL. Probably the priority rank. The basis for them was basically a well-distributed network of key watersheds for these anadromous fish. The ones on the Snake River, they are already in consultation with Dr. Tillman's agency. And so those, of course, worked jointly with them.

In terms of priorities, those have not been established yet, other than on the basis of the 1991 document that indicated the risk level for many of those stocks. Many of those stocks are being re-evaluated in terms of risk level, and I assume those would be integral in terms of importance and priority, we would put on some of those watersheds.

Mr. DEFAZIO. Okay. Thank you.

Mr. VENTO. Does anyone else want to add anything else? Mr. Penfold.

I wanted to conclude because I know that there is a suggestion about monitoring programs and the status of monitoring programs and the lack of 150 years of data—which I guess you would have to say you don't have 150 years of data—but can the scientists give us a general idea of the importance of that and the adequacy in terms of plotting our policies on the existing data and what we would have to do in the future in order to be certain that we are staying on course and achieving the goals?

Dr. Sedell, a microphone has been passed to you. Nobody else—this is obviously not an easy question.

Dr. SEDELL. No. But in terms of change in the way we have been doing some of those things, I think there is enough technical information and science around.

Our options are kind of limited in some places. In terms of acquiring an information base to see if we are going to do a high-risk land management change and be more conservative or protective of that and we are going to get the benefits. Yes, I think we have that, and we are going to monitor. In the past we have not.

And we are going to have to do a better job of looking at it not only in terms of habitat but some of the biological components that we are, obviously, trying to protect. So I think any change of direction is going to have to be figured very, very closely with good, reliable monitoring that has some integrity to the data set and attention to maintaining it through time.

Mr. VENTO. Mr. Williams.

Mr. WILLIAMS. Too often I think our monitoring that we have done has been limited to a prescriptive monitoring. In other words, have we done what we said we were going to do.

Another important element of that is sort of effectiveness monitoring. Did we do what we said we were going to do, what affect did that have on the landscape?

And I think when we are talking about ecosystem management and implementing that, one of the key features and the concept of adaptive management and you have got to monitor the landscape out there and be committed to being able to change your manage-

ment in response to what we are actually seeing unfold in terms of improvement of watersheds or deterioration of that sort of thing.

I think that is something, like Jim mentioned, that we have recognized that we really have got to pick up on.

Mr. VENTO. We could go on, I know.

Mr. LEONARD. Mr. Chairman, Dr. Swanson would like to——

Dr. SWANSON. From the standpoint of learning what is working and what is not and cost effectiveness, I think that if any restoration project is funded that there should be a specific commitment to monitoring built into that.

In the Pacific Rivers Council proposal, for example, about 15 percent investment is directed that way.

Mr. VENTO. It occurs to me that it is important because it is something that can easily be excluded.

And, if you get all the agencies cooperating so that there is a commonality and maybe even other private cooperators and the states, I think that it really can help in terms of reducing it and make certain that, as you say, you are taking an option that limits certain harvests, that does a number of other things, that is not an easy step to take. And you want to be certain that you are accomplishing what is intended in terms of the land management policies. So the monitoring, really, is the accountability factor and to keep it on course in terms of achieving what we are doing.

I think that this discussion about the ecosystems is all very interesting in terms of total ecosystems. But so far I think we thought we were smart enough to solve this with rifle shots instead of classifying entire ecosystem, which is a demonstration we don't know about some of the underlies problems of the specific species to be able to do it without embracing a broader range of conditions in the accomplishment of preservation of biodiversity.

I could go on with a lot of questions; but, as you know, gentlemen, I have a long list of witnesses. But I do, very much, as I said, appreciate the efforts that you have made and that you will be making. And we look forward to benefitting from your input as we try and craft this difficult policy in the year ahead.

Thank you very much. Thank you.

Mr. VENTO. We are going to change groups here. The second panel has probably been waiting, and the third panel is waiting. We have Mr. Bob Doppelt, the Director of the Pacific Rivers Council, Eugene Oregon; and Dr. Chris Frissell, Oak Creek Laboratory, Oregon State University, Corwallis, Oregon; and Mr. Pat Higgins, the Northwest Chapter of the American Fisheries Society and Pacific Watershed Associates, Humboldt, California; and, finally, on this panel, Dr. J. F. Palmisano, Oregon State University, Corwallis, Oregon.

PANEL CONSISTING OF BOB DOPPELT, EXECUTIVE DIRECTOR, PACIFIC RIVERS COUNCIL, EUGENE, OR; CHRIS FRISSELL, OAK CREEK LABORATORY, OREGON STATE UNIVERSITY, CORWALLIS, OR; PAT HIGGINS, THE NORTHWEST CHAPTER OF THE AMERICAN FISHERIES SOCIETY AND PACIFIC WATERSHED ASSOCIATES, HUMBOLDT, CA; AND JOHN F. PALMISANO, INDEPENDENT FISHERY SCIENTIST REPRESENTING NORTHWEST FOREST RESOURCES COUNCIL, PORTLAND, OR

Mr. VENTO. Your statements, by previous request, have been submitted and placed in the record; since we are under a little time constraint, if you will try to summarize your statements in about five minutes. I won't keep a clock, because you might get done earlier. But I think what you have got to say is important to the committee. And so we want you to have adequate time so say it; but if you could summarize it, it would help us. Dr. Doppelt, welcome.

Mr. DOPPELT. I have never been called Dr. Doppelt. I appreciate it.

Mr. VENTO. We do a lot of things but not grant degrees. I am sorry.

STATEMENT OF BOB DOPPELT

Mr. DOPPELT. Thank you. I am the Executive Director of the Pacific Rivers Council. I am going to shorten my comments today. I appreciate Congressman Dicks and Mr. DeFazio's comment. They say everything that we need to say. I will try to highlight the key points.

First of all, the proposal that we have made to Congress is the result of a two-year-long project that involved scientists from across the country and regional and local scientists to develop, to access, the Nation's river protection and restoration strategies and policies and to determine the strengths and weaknesses in those and to propose alternatives.

The end result of our major effort, which is now released in this document, "Entering the Watershed: An Action Plan to Protect and Restore America's Rivers Ecosystems and Biodiversity." Our conclusion is that, in fact, the Nation's river protection policies have failed and that new restoration and protection policies are needed.

This specifically addresses the Pacific Northwest where it is clear that our river systems and our aquatic biodiversity, salmon in particular, have been depleted and new approaches are needed. Given that, I want to make six key points, and then we can discuss the rest in the question-and-answer.

First I want to make it clear that the endangered salmon of the Pacific Northwest are just symbolic of the range of river ecosystem and biodiversity system problems and losses occurring across the region. The crisis is not just with salmon but entire watershed ecosystems.

I can cite many examples of the riparian species and resident fish populations that are at risk. It is not just anadromous salmonids. The Northwest is in the midst of an unprecedented crisis.

Second, although the media has focused on the dams and some studies that we may hear about later from this panel, and have

tried to point the blame everywhere possible including dams. It is clear to a number of specific panels and organizations that have looked at the issue that the most fundamental issue that underlies all of the problems is the cumulative degradation of watershed ecosystems and the loss of river habitat. That is the most single contributing factor to the loss of these species, the problems with their ecosystems. This does not mean that if we fix the habitat and fix the species that we can, in fact, save all the salmon. Indeed, we are going to have to address a number of other factors; but this is the fundamental issue.

Third, there is no quick fix to this problem. We have got to understand that. There is no silver bullet.

But, fourth, I would like to say that there are some immediate steps that we believe can be taken and should be taken and should be taken very quickly. And we have heard about some of those today. Numerous scientific studies have confirmed that, basically, the remaining pockets, the few remaining pockets, of healthy habitat and healthy river ecosystems are on public lands, primarily in the roadless areas, unroaded areas, and primarily in old growth areas across the region. These areas, we believe, must be correctly identified and protected to form the physical refuges for biodiversity and sources for the fisheries to recolonize and restore. They are the key to the existing health of the remaining rivers and are the anchors for the watershed restoration programs. We believe it is imperative in identifying and protecting these areas at the watershed level.

Following the protection, we think the next step is to secure these areas. And we differentiate the word "protect" from "secure." What securing them means is to identify, from a full watershed level analysis, what the potential threats from either past management activities or future activities are to these areas and to diffuse these threats to the extent possible or eliminate the threats if possible, for many, many of the watersheds on the west side of the Pacific Northwest. Scientific studies have indicated that it is, in fact, the road systems that form the greatest threat to many of these key watersheds.

And those are the areas that need to be treated. The road systems must be looked at and assessed and a priority system developed to diffuse potential catastrophic debris flows that may go into the remaining healthy areas and diffuse chronic sedimentation problems. I want to reiterate that to secure the area and protect the areas is not going to solve the whole problem. This is just step one in a watershed recovery strategy, but we believe it is the first step that must be taken quickly.

When we ran two workshops with scientists in Oregon in the fall, we looked at a number of records in the key watersheds and said, look, we have not had a major rain event in the Pacific Northwest except in the Seattle area since 1990, that many of these road systems are, essentially, a series of loaded guns that could go off. It could fall out into the river systems in the next major rain event so the time was of the essence to get in there and essentially diffuse these to the extent that we can.

Fifth. The fifth point I would like to make is that following the protection, the identification, protection and securing of these

areas, then full watershed restoration protection and restoration strategies should be developed.

Let me back up and say that, in addition to protecting and securing the key watersheds simultaneously, we believe that ecologically based riparian and flood plan plans must be applied across Federal lands.

Fifth, again, restoration then follows through a full watershed level restoration strategies. However, we believe, as Congressman DeFazio pointed out, that restoration must take an entirely new approach. Our extensive analysis of the traditional prioritization strategies documents that these approaches have, for the most part, failed. Traditional prioritization strategies, which generally focus on treating the most degraded and isolated stream segments or to address just water temperature or water chemical pollution problems, have failed. They do not address the whole ecological system.

They often, in fact, as I think we had heard from other members of this panel, can lead to further problems in the system and not help. At best, these kinds of strategies can be called Band–Aid strategies, at worst some have called them "rat hole" strategies, meaning that we are throwing our money down a rat hole with these strategies.

We propose pulling together a watershed analysis to identify the conditions and needs of the basin first and then focusing on protecting the remaining healthy head waters, key biotic refuges that we have been calling the riparian areas across the landscape and what we call benchmark watershed. Still, impacted tributary watersheds that exist on Federal lands hold the only hope for long-term research on change in ecosystems and biodiversity over time. I think that is going to be vital to hang on to those areas and to identify and protect the healthy patches of habitat that are found throughout the rest of the system. We call all these biological hot spots. This places the approach on preventing further degradation rather than on attempting to control problems after they occur.

Following this restoration would focus on trying to link the healthy areas and expand the healthy areas before we plow significant amounts of dollars into the most degraded areas. We are not saying to not treat the degraded areas but, as Congressman DeFazio said, when dollars are short and limited, we need to make sure that we are protecting and building restoration around the healthier areas before we sink money into highly speculative attempts to restore the most degraded areas. We can talk about that in a minute.

Finally, we recommend to effectively implement the strategy that I have described. A coordinated strategic watershed initiative is needed across the Pacific Northwest. In fact it is needed Nationwide on river systems all over the country. This must involve a number of points.

One, uniform, consistent riparian flood plan and habitat protection standards for all Federal land management agencies based on ecological definitions. It must include ecosystem and watershed level planning by all Federal agencies. It must include a comprehensive restoration strategy that, again, as I described, includes the protection of watershed or river biodiversity watersheds. It

must focus on linking and securing and expanding the healthy areas and habitats and bring in, eventually, the private landowners and local communities to the process.

As these rivers flow through private lands, we must generate local jobs in restoration and other economic benefits to support that. And we must also provide long-term funding for this strategy because this is going to be a long-term process.

To implement this in the Pacific Northwest, as has been discussed, we propose a Watershed and Salmon Habitat Restoration Act. We believe, as you heard today, that the agencies are going to change and do better under this administration. We applaud that and support that.

However, we believe that history shows us that the agencies may not do everything that is needed, and administrations come and go. Hopefully this administration, from my point of view, will be here a long time. But nevertheless the watershed and the health of our fisheries cannot be at the whim of the next political change or the local district ranger who may decide to apply a specific administrative procedure or not.

We believe that these policies must be legislatively established to make sure that they exist to provide clear direction. This act that we looked at, based on the stormproofing strategy of securing the watersheds and treating the road systems, we believe, will create 7,000 to 11,000 family wage jobs, over $81 million of the total cost of 156 million which we are projecting will be, in fact, in heavy equipment work.

So these will be family wage jobs that primarily will end up in the rural communities. We want to make it clear, again, that the sedimentation issue varies by watershed. The sediment delivery rate from these road systems varies by watershed. So, consequently, it is not just the roads that need to be looked at. We need to look at reinserting woody debris into the system. Those are all part of what the watershed level restoration strategy must be.

In closing, we would like to say that, again, we support the administration's and the agency's attempts to improve their policies. But we believe that this will not really happen in an effective way without the leadership of Congress and a demonstrated leadership to the Pacific Northwest because Congress has acted affirmatively to say that this is how the land will be managed in the future.

Mr. VENTO. Thank you.

[Prepared statement of Mr. Doppelt follows:]

Testimony of Bob Doppelt
Executive Director, Pacific Rivers Council
before the House Subcommittee On Natural Resources, Forests and Public Lands
March 11, 1993

The degradation of The Pacific Northwest's riverine ecosystems and the extinction of salmon and other forms of riverine-riparian biodiversity have reached alarming levels. Not one river system in the region has been spared. Fisheries, healthy water quality and quantity produced by watershed ecosystems, and entire aquatic food chains are at risk.

For the past two years the Pacific Rivers Council has been involved with a major project to assess the capability of the region's (and nation's) riverine system and biodiversity conservation strategies and policies to address this crisis. The project has involved over 35 top scientists, economists and community development specialists nationwide. We conclude that the region's existing policies have failed. Entirely new strategies and policies must be established quickly to stave off the impending collapse of many riverine systems and to prevent wholesale biological extinctions.

THE EXTENT OF THE CRISIS: To realize the breadth of the problems one must first have a template of healthy ecosystems and biodiversity. Healthy river ecosystems in the Northwest are characterized by a number of factors including: 1) Water quality, 2) Water quantity, 3) Channel Characteristics:, 4) Riparian Vegetation, 5) The condition of the stream is a function of the characteristics of the entire watershed.

By the same token, healthy biodiversity requires a wide diversity and abundance of species and organisms, not just the presence of few key species.

However, whether measured by the health of riverine species, or by physical parameters, the current status of the Pacific Northwest's riverine ecosystems and fisheries is one of widespread degradation.

Loss of Fish Species: At least 106 populations of West Coast salmonids (salmon, trout, steelhead and char) have been driven to extinction and over 210 salmon populations are currently at risk of extinction according to the American Fisheries Society. The Sacramento River winter chinook salmon, and the sockeye and fall, spring, and summer chinook salmon of the Snake River basin are among the Pacific Northwest fishes listed as protected species under the Endangered Species Act. Petitions have been filed for sturgeon, bull trout, Columbia River coho salmon, Illinois River winter steelhead, and other fishes, whose listing could have widespread consequences for the region. Hundreds of other freshwater and anadromous fishes probably qualify for, and could receive, federal protection in the near future.

However, more than just salmon are at risk. The endangered salmon are just symbolic of a range of riverine and riparian biodiversity losses occurring across the Pacific Northwest. For example, at least 132 species of riparian associated animals, including 3 birds, 4 mammals, 12 amphibians, 45 mollusks, 34 anthropods and over 700 out of 1100 native fishes (estuarine, resident etc) on 348 streams were found to be at risk of extinction within the range of the Northern Spotted Owl from the Cascade Mts. to the ocean (Northern Spotted Owl recovery Plan, Appendix D). Similar patterns and levels of depletion can be found in arid and semi-arid biomes throughout the region.

The economic and social impacts of degraded riverine systems and lost fisheries and biodiversity are severe. Just a few examples are necessary to depict the impacts. Since 1910, annual salmon and steelhead runs of the Columbia river system have declined from approximately 10-16 million to 2-2.5 million. Yet, the fishery still produces over $1 billion a year in income and supports 60,000 jobs regionwide (using 1988 figures). How many jobs and economic benefits could a healthy fishery produce? Further, diminished and polluted water supplies produced by the regions watersheds are affecting irrigation and municipal water supplies and threaten public health.

In short, almost every segment of society has been affected by and pays heavy direct and indirect ecological, financial, and job-related costs for the degradation of the regions riverine systems, fisheries and riverine biodiversity, whether they are aware of it or not.

THE CAUSES OF THE PROBLEMS: Although the media has generally focused the problems on mainstem Columbia dams, these types of broad ranging problems cannot be blamed exclusively on dams, nor on excessive fishing, or on predators such as sea lions. Over 175 of the 214 at risk salmonids spawn outside of the Columbia basin, most in coastal rivers unaffected by dams. Most of these species are not subject to commercial harvest. Poor ocean conditions, dams and overharvest would not explain the vast number of riparian species or resident fish such as Bull Trout that are at risk.

The cumulative degradation of watershed ecosystems and the loss of riverine habitat is the single most consistent contributor to the decline of the region's fisheries and riverine biodiversity.

The cumulative result of the many human impacts on riverine systems has been called "ecosystem simplification": huge reductions in the life-supporting complexity and diversity of watershed and riverine ecosystems and habitats.

In brief, riverine ecosystem and habitat simplification relates to: 1) changes in water quantity or flow due to irrigation and other withdrawals, 2) the modification of channel and riparian ecosystem morphology caused by damming, reservoirs, channelization, drainage and filling of wetlands, and dredging for navigation, 3) excessive nonpoint-source pollution, including erosion and sedimentation caused by damaging land-use practices, including agriculture, forestry, and urbanization, 4) the deterioration of substrate quality or stability, 5) the degradation of chemical water quality through the addition of point-source contaminants, 6) the decline of native fish and other species from overharvest and intentional or accidental poisoning, and, 7) the introduction of exotic species.

Loss of Physical habitat: Many scientists have linked the future of the region's native fishes directly to the changes in the management of federal forests and other lands across the region. Loss of physical complexity in lowland rivers which primarily flow through private lands is extensive. Virtually all lowland rivers throughout the region have been universally degraded through channelization, diking, leveeing, revetting and riprapping and excessive water withdrawals, thereby disconnecting the rivers from their floodplains and groundwater systems. An estimated 70-90% of natural riparian (streamside) vegetation, vital to maintaining the integrity of riverine ecosystems and biodiversity, has already been lost due to human activites. Seventy percent of the region's rivers have been impaired by flow alteration.

Loss of private land lowland habitats has placed much of the burden of maintaining the health of both riverine ecosystems and biodiversity on the federal forest lands in the region. While federal forest habitats have also been degraded, the best remaining habitats are found in the federal forests primarily in unroaded, steep watersheds dominated by old growth forests.

Even on the federal forests river reaches are degraded. Recent research has documented that fish habitat on National Forests and other lands currently has fewer pools, higher fine sediments in spawning gravels and fragmented riparian vegetation than is healthy. For example, the number of large deep pools in many tributaries of the Columbia river have decreased in the past 50 years in resurveys completed between 1989 and 1992 by Forest Service researchers. Overall there has been a 30 to 70 percent reduction in the number of large, deep pools (>6ft. deep and > 50 yd surface area) on National Forests within anadromous fish in the past 50 years. A similar trend has been found in streams on private lands in coastal and eastern Oregon, Washington, and Idaho where large deep pools have decreased by 60-80 percent. Large pools are important for anadromous fish as holding areas for adults for spawning, refuge from drought and winter icing, maintenance of fish community biodiversity and juvenile fish rearing areas.

The primary reasons for these losses are increased sediments, loss of stream sinuosity by channelization and loss of woody debris and other pool forming structures. Only in a few watersheds are exceptions to this trend: the Methow and Wenatchee rivers in Washington both of which contain large roadless areas.

THE NEEDS THAT MUST BE ADDRESSED

THE ECOLOGICAL NEEDS: Numerous scientific panels have confirmed that only a few pockets of healthy habitats and ecosystems remain regionwide (Scientific Panel on late Successional Forests. 1992 and American Fisheries Society, 1993 in press). These "key watersheds" act as physical refuges for fisheries and biodiversity and as a source of species to recolonize degraded areas once restored. These areas also are the key to maintaining the existing levels of health for the systems, and hence are the "anchors" for watershed restoration programs. It is imperative that these best remaining key watersheds be quickly identified and protected at the watershed level to provide a basis to maintain and restore the region's riverine systems and biodiversity. In addition, ecologically based riparian and floodplain protections must be immediately implemented across the landscape on federal lands.

Once protected, the key watersheds must be "secured" which means threats to the remaining healthy areas must be defused or eliminated.

Watershed level restoration plans should then be crafted and implemented. Each plan should be based on a watershed level analysis of the specific needs and varying conditions of the watershed. Long term monitoring is vital to insure that the restoration treatments are successful and to provide feedback for strategic changes in restoration goals and strategies over time. It is important to note that there are no quick fixes available. Restoration is a long term process. What needs doing immediately is to stop the hemorrhaging of the systems by identifying, protecting and securing the remaining healthy watersheds and riparian areas. Restoration efforts will provide more effective if built around the healthier areas.

THE POLICY NEEDS: The National Problem: In part, the problem is symbolic of problems nationwide. For example, the United States has no national goal to protect or restore riverine ecosystems or riverine-riparian biodiversity and no national policies that mandate coordinated federal, state, and private management and conservation of whole riverine systems. Traditional river assessments have been biologically ineffective. No policies require the identification and protection of the remaining healthy riverine habitats. No effective riverine restoration policies exist at any level of government. Finally, no policies effectively integrate riverine protection and restoration with local job creation and community revitalization.

Internal reviews by the Forest Service concede that maintenance of physical riverine habitat on national forest lands cannot be assured under current management direction.

Federal Land Management Policies and Guidelines are Inadequate: Despite the need to quickly identify, protect and secure the best remaining habitats, and to implement watershed level restoration strategies, current federal land management policies, standards and guidelines fail to address these needs.

A complete exposition on the failures of federal land management laws to protect riverine ecosystems and fish habitat at the watershed level is beyond the scope of this testimony. Suffice it to say that the problem is not that federal land managers lack some of the authority to protect these resources. The majority of the problem is that existing authority leaves too much to agency discretion. Some policy gaps do exist however, including legislative mandates to align agency missions, goals and management policies within watersheds. We know that the agencies have not used the power they clearly have to provide an adequate level of protection and to compel restoration. We conclude that they will not take decisive action without stronger, clearer statutory guidance requiring specific actions to address the current crisis facing river ecosystems and fish habitat on federal lands. A few examples of existing authority which has not been fully exercised follow:

(1) The National Forest Management Act (NFMA) prohibits timber harvest where "watershed conditions" will be "irreversibly damaged" or where "water conditions or fish habitat" will be "seriously" or "adversely affected." The Act also requires the identification of marginal lands deemed "unsuitable for timber production," such as where "resource protection or reforestation cannot be insured." In practice, neither of these provisions has prevented timber harvests which significantly degrade water quality and fish habitat.

(2) NFMA also requires that the agency develop planning guidelines which "provide for diversity of plant and animal communities based on the suitability and capability of the specific land area in order to meet overall multiple-use objectives . . . " a provision which has been interpreted in regulations to require: "[f]ish and wildlife habitat shall be managed to maintain viable populations of existing native and desired non-native vertebrate species in the planning area." 36 CFR U 219.19. The agency has acknowledged its general duty to maintain a level of biodiversity "at least as great as that which would be expected in a natural forest" where "appropriate" and "practicable", but has not developed a policy which requires the use of those indicator species most sensitive to land management activities on a regional basis. 36 CFR U 219.27(g). Nor has the agency failed to adequately distinguish between species and populations (stocks) in determining its viable populations requirements. Litigation is currently underway which could result in judicial clarification of the scope of the Forest Service's duties.

The agency has also generally utilizes individual habitat criteria such as water temperatures to evaluate the health of streams. These criteria are woefully inadequate. As previously stated, the health of a stream is determined by the combination of a multitude of factors.

(3) The BLM's primary management statute, the Federal Lands Policy and Management Act, directs the BLM to "take any action necessary to prevent unnecessary or undue degradation of the [public] lands," but there is no statutory definition of unnecessary and undue degradation, and it is left entirely up to the agency to determine what actions are "necessary." Rather, the BLM may, but is not required, to protect biologically significant "areas of critical environmental concern" in developing and revising land use plans. To date, this mechanism has not been widely used to protect critical riverine habitat.

(4) Both agencies are subject to "multiple-use, sustained-yield principles," which require that listed resources, including watershed and fish habitat, to be managed for long-term productivity. These principles give the agencies clear authority to reject economic optimally as the primarily decision making criterion. These principles do not, however, provide any hard constraints on land managers, and require that agencies merely give "due consideration" to the various competing uses.

(5) The Clean Water Act requires the maintenance and preservation of the biological integrity of the nation's waters, but, to date, the Act has failed to prevent the massive landslides and stream sedimentation associated with logging in unstable watersheds -- despite the use of "Best Management Practices."

A Word On Enforceability: We do not overlook the fact that each of the agencies has developed guidance of various kinds which applies to the management of rivers and riparian areas. However, except for those few forests or districts with specific riparian management language in their land management plans, most riparian management guidelines which do exist appear as text in agency manuals and handbooks, provisions or technical guides, none of which is binding on the agency or legally enforceable by affected parties.

For example, the Willamette National Forest has promulgated a technical guide entitled "Riparian Management Guide." This is generally acknowledged to contain the most contemporary, scientifically defensible riparian protection standards in the Forest Service. However, this document does not itself contain any directives which are binding on the agency. Rather, it is an informally promulgated document, not subject to the notice and comment procedures of the Administrative Procedures Act, and not, therefore, enforceable against the agency in a court of law. See e.g. Lumber Prod. & Indust. Workers Log Scalers Local 2058 v. United States, 580 F. Supp. 279 (1984) (forest service manual provisions not binding because not promulgated by Secretary of Agriculture under a specific statutory provision and APA procedures); United States v. Fifty-three Eclectus Parrots, 685 F. 2d 1131 (1982) (agency pronouncement must be legislative in nature to have the force and effect of law, and be promulgated under a "specific statutory grant of authority" in conformance with Congressionally imposed procedural requirements).

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Consistency: Not only do the BLM and the Forest Service have different riparian policies, the agencies are not internally consistent. For example, internal reviews in Forest Service Region 6 reported disparate standards and guidelines among forest plans for fishery resource protection, concluding that none of the plans reviewed ensure the continued viability of salmonid populations. (Heller et. al., 1991). As one investigator discovered, "planning criteria, indicators for measuring resource values, modeling assumptions, and analytic procedures varied substantially among forests, such that direct quantitative comparisons between plans are of only limited value." (Frissell, 1992). Likewise, standards and guidelines for riparian management varied considerably among forests: the Willamette (Oregon) and Shasta-Trinity (California) National Forests have adopted a no-cut buffer averaging 100 to 200 feet wide, and ranging up to 400 feet, on all class I, II and III streams, while the Mt. Baker-Snoqualmie and Olympic National Forests (Washington) allow extensive logging in all riparian areas, with a few restrictions to prevent total stand removal. Few plans provide any protection at all for Class IV tributaries and fewer still protect riparian areas along headwater streams, despite their important contributions to the downstream environment.

An example of new authorities needed: 1) Inter-Agency Policy Consistency and Alignment to Manage at the Watershed level.

Although a number of federal statues speak to inter-agency coordination, agencies are still authorized to act based on their own statutory goals and mandates and internal agency priorities. Legislation which defines common missions and goals, and aligns agency management policies of riverine-riparian ecosystems and biodiversity is needed to provide watershed level coordination and consistency.

CONCLUSION: PRC believes that new policies is needed to provide uniform watershed protection and restoration directives for all federal land management agencies. These policies must include riparian management directives directly from Congress, elevating important issues of riparian policy from the lowest levels of administrative authority to the highest level of government.

THE FAILURE OF TRADITIONAL WATERSHED RESTORATION APPROACHES

A recent American Fisheries Society report found that "In the past 10 years, many millions of dollars have been spent on stream habitat management in Western North America. We find little documented evidence of increased abundance of salmonids associated with these massive expenditures."

Traditional approaches to stream habitat and ecosystem restoration can be characterized as "band-aid" approaches that have several distinguishing features. First, the identification and diagnosis of habitat problems tends to be focused on finding patches of habitat that are amenable to predetermined, generic techniques. For example, many past and current programs rely heavily on installation of log weirs to construct pools in streams. Planning for these projects generally focuses on identifying reaches of stream that do not meet water temperature standards or with gradient and bank structure suited physically to the installation of such devices, and that happen to be accessible to the heavy equipment needed to do the work. There is little consideration whether the fish community, or the watershed as a whole, are suited to the kinds of changes of habitat these structures are intended to induce. It is commonly assumed that all fish benefit equally from the plunge pool sequences created by such devices, and that the construction of weir pools will compensate for all of the diverse changes in the ecosystem caused by human disturbance.

Some evaluations of these projects indicate serious shortcomings. For example, where log weirs and other artificial structures achieve their physical objectives, their effects on native fish can be insignificant, or even negative. In other cases, they may stay in place, but have unintended and damaging physical side effects, such as severe bank erosion or blockages to juvenile fish migration. Finally, in many cases, such structures suffer a high incidence of outright physical failure. The results of numerous studies suggest that the effects of such projects are inconsistent and difficult to predict. Conditions in the watershed as a whole appear to be more important than structure design in determining whether structures will function or fail. Failure rates are especially high in severely damaged watersheds or stream reaches where disturbances are ongoing. Furthermore, in some watersheds fish populations are so widely depleted by extensive habitat degradation and other factors that few or no fish are available to colonize artificially created habitats. Finally, the vast majority of streams are not accessible to heavy equipment or are otherwise unsuited to structural modification. Put simply, traditional techniques fail to address the root biological and physical causes of habitat deterioration and population decline, and often aggravate, complicate, or add to existing problems.

Priorities for traditional "band-aid" restoration approaches are typically determined by identifying the worst-degraded or ugliest-looking sites, and spending all available resources treating these areas with generic and largely cosmetic structural techniques to "bring them up to standards." Once the desired improvements have been made, further habitat-disturbing activities in the watershed can be allowed to proceed.

The result of the "band-aid" strategy is predictable: disturbances are maximally dispersed across the landscape, and virtually all sites across the landscape are homogeneously degraded. The worst sites may be partially "fixed," but meanwhile disturbance-sensitive species have likely been lost through the entire stream system. As road networks and logging units are dispersed across the landscape, virtually every tributary and stream reach becomes vulnerable to management- accelerated disturbance from sedimentation and other effects when the next large storm strikes. Because no effort is made to identify and protect key watershed refugia, the most productive and diverse habitats are subject to continued disturbance, while the most severely degraded areas (inherently the least amenable to structural improvement, and therefore the most likely sites of project failure) receive all the restoration resources. In other words, this strategy is a recipe for the degradation of the remaining healthier watersheds and other kinds of secure ecological refugia– leading predictably to the cumulative extirpation of formerly abundant, but sensitive species over large areas.

Past and present approaches to the management of watersheds and riverine-riparian have not only allowed the present crisis to develop, they have indeed exacerbated it. For example, the intense fisheries generated during periods when hatchery stocks are productive have often driven wild stocks into decline and local extinction. Perhaps worse, reliance

on increasingly costly, heavily subsidized artificial production of hatchery salmon has facilitated the decline of natural populations, by temporarily masking their loss. As even the most successful hatchery populations suffer the inevitable collapse from disease, genetic depletion, or technological failure, natural populations remain the only sufficient seed source to restore artificial production.

After a century of experimentation, there is little scientific support for the notion that salmon hatcheries are sustainable over the long term in the absence of wild, natural populations, or that hatchery technology can work to supplement or restore remnant wild populations without seriously harming them. Each wild population of salmon and trout is uniquely and subtly adapted to its environment, in ways that are not fully understood by scientists. These adaptations can be quickly lost in the hatchery environment or in the presence of large numbers of stray fish of hatchery origin. Therefore the viability of the species remains dependent on the conservation of the diversity of its wild populations and their habitats. Beyond this, wild populations adapted to marginal or disturbed habitats could in the future be the only source of suitable colonists for re-establishment of populations in an environment where, despite efforts toward restoration, human impacts will remain pervasive.

RECOMMENDATIONS FOR A COMPREHENSIVE WATERSHED RESTORATION PROGRAM

To protect and restore the Northwest's riverine systems, fisheries and biodiversity, we recommend a new approach founded on principles of watershed dynamics, ecosystem function, and conservation biology -- a community and ecosystem-based strategy that maintains and restores riverine processes and biodiversity at the watershed level. The new approach integrates ecologically and economically sustainable restoration strategies in a scientifically defensible and conservative way, emphasizing principles of the physical and ecological functions of watersheds and key spatial and temporal aspects of aquatic ecology. Simple in concept and pragmatic in application, this new approach provides a means for prioritizing protection and restoration policies and interventions and for creating more-rapid and cost-effective biotic recovery. This program would involve three interconnected components:

1) The program begins with a comprehensive effort designed to identify and protect the remaining relatively healthy headwaters, key biotic refuges, benchmark watersheds, riparian areas, floodplains, and the network of biological hot spots found in patches throughout entire river systems on federal lands. This cost-efficient approach places the emphasis on preventing further degradation rather than on attempting to control problems after they occur.

2) Following the protection of these areas, watershed level restoration programs should be developed. Restoration treatments should focus initially on "securing" or "storm proofing" the relatively healthy areas on federal lands stated above. After these areas have been secured, restoration would focus on providing better management between the protected areas and eventually linking and expanding the healthy areas. Private lands would be brought into the program to develop river system wide restoration strategies.

3) Finally the program calls for the active participation of local communities and citizens in implementing the restoration program. Without support from local communities and citizens, any policy will fail. To help generate support, local jobs in restoration technologies including the "storm proofing" of the key watersheds, and community revitalization projects must be created. These projects are needed to restore riverine systems, and they offer the benefit of providing jobs and economic benefits. Floodplain open space preservation and such economic conversions as new crops that are less water- and energy-intensive, and the protection of undeveloped floodplains must also be encouraged. Incentives and technical assistance must be provided to encourage local involvement in taking these steps and in designing and implementing watershed level restoration action plans.

Necessary Federal Steps:

To implement the new restoration approach, a coordinated strategic watershed restoration initiative is required. We recommend that the federal government establish the following:

* A coordinated strategic watershed protection and restoration initiative in the Northwest. The program must be a top-level national priority.

* A single department with clear policymaking authority to coordinate and implement the watershed protection and restoration program. Federal land management agencies can align their own policies. We recommend that the watershed level program that includes private lands be operated by the Environmental Protection Agency (provided EPA is given cabinet status and its performance is greatly improved.)

* Uniform, consistent riparian, floodplain and habitat protection and restoration standards for all federal land management agencies.

* Ecosystem and watershed-level planning by all federal agencies.

* A comprehensive ecosystem-based watershed protection program for all federal land-management agencies. This includes the creation of a regional (and nationwide) system of "Watershed (Riverine) Biodiversity Management Areas" and "Benchmark Watersheds".

* A comprehensive ecosystem-based watershed restoration program that focuses initially on securing, linking, and expanding the remaining relatively healthy ecosystems and habitats.

* Coordinated private land and watershed restoration programs that generate local jobs and community revitalization projects, and support appropriate economic conversions.

* A moratorium on new dam construction, a national "protected river" program, and a process to prioritize, remove, and alter the most damaging dams and water projects within river systems.

* Stable long-term funding and sufficient financial and tax incentives for watershed restoration.

* Amendments to the existing federal land management agency rules, standards and guidelines so that they support the protection and restoration strategies, goals, and policies outlined in this testimony.

IMPLEMENTATION POLICIES: To implement the proposed goals and strategies, we recommend two immediate policy steps: the ***Watershed and Salmon Habitat Restoration Act*** and ***The National Watershed Registry***.

The Federal Lands Strategy: We propose that the strategies and policies proposed in this testimony be immediately implemented on federal lands through a **Watershed and Salmon Habitat Restoration Act** in the Pacific Northwest. Over 200 anadromous salmonids (trout, steelhead, char, and salmon) are at risk of extinction, and watershed ecosystems are highly degraded regionwide. At the same time, the region is certain to soon protect critical habitat for the Northern Spotted Owl and other species. Implementing the new federal land riverine policies in conjunction with the impending protection for these species will provide a more structured and integrated land protection and management scheme.

This Act will also provide a short term infusion of much needed jobs in rural communities.
For example, a draft estimate of the costs of securing 137 key public-land watersheds in the Pacific Northwest indicates that between 7,000 and 11,000 family-wage jobs would be created over the period of implementation. Much of this would involve heavy bulldozer and excavator equipment work to remove, upgrade or otherwise alleviate sedimentation problems caused by forest roads.

Ultimately, we recommend that these changes be made on federal land *nationwide* through a new *Federal Lands Riverine Management Act*: a comprehensive, uniform policy that would be applied to all federal lands and that mandates watershed-level, ecosystem-based protection and restoration. One uniform federal policy is needed to cut across the many conflicting policy fragments that exist today concerning riverine systems and biodiversity on federal lands. Federal lands are critical to the health of the nation's rivers: much of the remaining natural ecological capital and much of the remaining biodiversity is found on federal lands, especially in the West. These systems must be protected quickly to prevent further degradation and to provide the fundamental buildmg blocks for long-term restoration.

The Private Lands Strategy: We propose the concurrent establishment of a National Watershed Registry to support existing programs and initiate new voluntary, non-regulatory state and local efforts to recover riverine systems on private lands. The National Watershed Registry is needed to support the many ongoing state and local efforts that have sprouted across the region but that currently are limited in effectiveness. It should also stimulate the growth of many new local efforts regionwide. The NWR would establish non-profit local watershed council on priority riverine systems that would develop and implement, from the bottom-up, Watershed Restoration Action Plans. The federal government would provide grants, funding and technical assistance to these programs. The NWR would focus stimulating appropriate economic benefits to local communities in three ways: local jobs and restoration technologies, appropriate community revitalization projects, and economic conversions such as agricultural changes to less water and energy intensive crops.

A complete description of these proposals is found in our recently released report to Congress: Entering the Watershed: An Action Plan To Restore America's River Ecosystems and Biodiversity.

THE IMPERATIVE OF CHANGE

Although we evaluated numerous federal and state riverine policies and programs in preparation for this testimony, we have not spent a great deal of time recommending improvements for each. We believe that improving existing policies, although important to do, will still not provide the strategies, policies and incentives needed to initiate an era of comprehensive riverine restoration nationwide. No existing policies appear to be based on contemporary scientific assumptions or knowledge, or effective implementation strategies and mechanisms. Until new policies are enacted, most efforts in improving, properly applying, or enforcing existing policies will remain primarily "rear guard" actions. That is, they may (but likely will not) maintain the existing levels of health for some riverine systems for a short time. However, they are certain to fail to maintain riverine health in the long run or lead to comprehensive recovery. New federal restoration goals, strategies, and policies are needed.

We hope to see the region and nation turned toward new strategies and policies that will protect and restore riverine systems, fisheries and biodiversity. New approaches are certainly needed. Riverine systems are the life-support system of our nation. These systems offer important sources of food, timber, fiber, water, and many other products that provide both jobs and sustenance. From the remaining healthy riverine systems will come vital genetic resources to recolonize the environment for future generations. And it is the natural beauty and recreational opportunities of our region's and nation's rivers that uplift the human spirit.

It is in our self-interest to protect and restore the Northwest's and America's riverine systems and biodiversity. It is also our moral responsibility.

Mr. VENTO. Dr. Frissell.

STATEMENT OF CHRIS FRISSELL

Dr. FRISSELL. Thank you. I am a researcher on the faculty of Oregon State University. I have a doctoral degree and a master's degree in fishery science, a bachelors in zoology. Since 1985 I have been doing research in southwest Oregon and a couple of other portions of the state of Oregon looking at the cumulative effects of human land use activities on salmon habitat and trying to develop approaches to ameliorating the effects of those activities.

My recent work, for the past year has been supported by the Oregon Rivers Council and its supporting foundations; and I have been working with them on developing the science behind effective restoration strategies, which I would like to emphasize is very different from the way we have been approaching piecemeal in the past and fish habitat improvement in the past. And I am here today with the support of the Rivers Council.

I have also been an active member of the American Fisheries Society. And the Oregon chapter of that organization has been active in monitoring and actively opposing the land use management plans of the BLM and the Forest Service.

Many professionals, if not most, in the area are very alarmed at the direction that the agencies have been taking for the past 10 years, at least in this region. And it gladdens me to see that there is at least a movement towards reforming the approach that those agencies have taken to the management of aquatic ecosystems and watersheds.

I have also been a key member of the subcommittee of the Oregon chapter of American Fisheries that started the ball rolling on this concept, and we have been working since 1989 to identify key watersheds. Some of our work was used as a template or a prototype for the Gang of Four.

So this concept of key watersheds and their critical role goes back quite a ways in the scientific community.

I would like to just share with you some results from the seven-year study that we just wrapped up; I and my colleagues in Oregon State and Southwest Oregon. From the standpoint of the watershed restoration issue that has been talked about a lot today, in this region virtually all the native salmonid species are in decline, some species precipitous, others more slow and chronic. But the most commercially important species, coho and Chinook salmon, have been in very serious decline in this region.

American Fisheries Society has considered them endangered in status throughout the area, and there has been a lot of discussion that petitions are likely to be seen soon. In this area, the tip of the mountains, there are high erosion rates typically in logged lands and eroded areas and there has been very extensive logging on private lands and somewhat less extensive but equally devastating logging on the public lands.

One of the reasons, even though the practices on public lands have been much higher level of responsibility than those of private lands over the past few decades, the incentive of the land, our Federal ownership, is higher depending on how you measure it; but the effects of the given area disturbed tends to be far in excess of the

same types of disturbance on the private lands in the area. This is one of the reasons that activities on Federal lands play probably as great a role in this region in the declines of salmon runs.

I might add that this region is not affected by dammed over rivers. The rivers that we studied did not have dams on them. We eliminated those two potentially confounding portions of decline in this area. There is compelling evidence that habitat changes largely resulting from logging have contributed in large measure to the decline of these stocks. Fishing has probably played a role synergistically with that.

And one of the things I wanted to mention—Dr. Williams mentioned it—the effects of change in the freshwater habitat are synergistic. And you can go to the list of other factors that are causing declines of salmon. Of course there are all kinds of species, and we have not begun to identify all the species that prey on salmon in the ocean. So there is a long list of scapegoats to blame the decline of salmon on, but the studies that have looked carefully at the salmon ecosystem have demonstrated that when freshwater ecosystems declined, the ability of those species to adapt to the changes in the environment is very seriously degraded. And the only reason that we still have naturally produced salmon in the Columbia Basin is that we have a few species that are intact and survival rates are able to make it through the gauntlet that they have to pass through both up and down river.

Something recent in the Columbia River Basin is interesting and suggests the same point that in studies where we have been closely following fish movements from the river through their system we are starting to find that a large share of the mortality is occurring before the fish get to the first dam. So somewhere in the freshwater environment above the dams we are losing lots and lots and lots of fish.

With the widespread loss of salmon habitat due to a range of activities—a lot of this was lost in the early century—salmon and other species have been isolated in headwater areas. And now what you are seeing suggests a very aggressive program of logging in these headwater areas that have come to serve as de facto refugia for these species. And that is why we are seeing the dwindling numbers that are very, very precarious.

So, by default, essentially the way we manage these headwater basins, most on public lands and most on the ones where the habitat is going associated with roadless or other undeveloped lands, is critical for the future of these fish and particularly the shortrange future.

When we look at a case study, say, on the Siskiyou based on our research we have identified probably about 16 and as a matter of fact the American Fisheries Society has identified about 16 watersheds around the Siskiyou Forest that seem to have a relatively high habitat and diversity of the native fish species. About three of those have partial protection in the existing wilderness. And many critical lands are not protected in the wilderness. Only three or four of those received protection under the spotted owl, the HCA designations, that were in the original Thomas plan for spotted owls which got some of the aquatic analysts going on identifying these for aquatic species. And 10 of those are associated with

roadless areas, each one of which has been targeted for extensive logging and roading in the future. One has an active 10 program ready to go when the Dwyer injunction is lifted. But perhaps we will see a change on the Forest Service's part there, but we have not seen that on the Forest Service level. Things are ready to roll by all appearances. These are the steepest most highly erosion-prone areas.

These areas have been stayed out of because of the problems in the past relating to logging and road construction. And it appears that there are no risk-free kinds of activities that we can do because this is where the last fish are left, and it is also where the most sensitive grounds are located. I would be probably more conservative in the recommendations than the Gang of Four about the management of those areas because of that sensitive nature of the lands; and there really are no risk-free activities.

So including the proposed changes in logging that have occurred under now prospectives or ecosystem management programs, those are not free lunch to cut trees on steep lands. We don't know what the effect that business will have on the sensitive lands. And we don't think that we can afford, from the fish's standpoint, to risk the watershed on such experiments. I think they are important experiments. But I think we should do them when their risk to other species is probably lower.

There are a lot of very key and good people in the agencies, Forest Service and BLM; and they are starting to play a more active role in the direction that the agencies are taking. But based on the past 20 years of direction, we have had 20 years of cooperation. Ostensibly, we have had 20 years of habitat improvement. And it has been a failure. And I think it is going to be difficult for the agencies, internally, without direction from outside, to just turn around 20 years of bad planning and start doing the right thing next year. The signs are good, but the signs are not so good in other cases when you look at it from what is going on on the ground, which is where I have been mostly in the past seven years.

So Bob basically covered the general aspects of the watershed restoration strategy. That was pretty embedded in the Gang of Four and seems to be very scientifically defensible. And it is a conservative strategy in that the capital that is invested in that program has the high probability of getting the effect that we want; stabilizing the species.

But I should point out that it is not going to get us very far to restoring the species. So historical abundances or high levels of fishery production, that is going to require going into downstream areas and Federal areas and habitats that have been, for a long time, degraded in the loss of these species. And that is going to require a whole different kind of approach than we have talked about today. And I don't think anybody knows how to do that.

It is going to be a long-term proposition to get that habitat back. And it is going to be tricky from the cultural and social standpoint. So what we can do now is secure what we have left and make sure that we don't lose it.

Mr. VENTO. Thank you, Dr. Frissell.

[Prepared statement of Dr. Frissell follows:]

Testimony of Christopher A. Frissell

Before the

Subcommittee on National Parks and Public Lands

Committee on Natural Resources

U.S. House of Representatives

Chairman Bruce Vento

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Federal Land Management and the Future of Salmon and Aquatic Biodiversity in the Pacific Northwest

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Introduction

The following text documents and elaborates upon oral testimony presented 11 March 1993 before the U.S. House of Representatives Subcommittee on National Parks and Public Lands, Washington, D.C. My testimony concerns the role of federal land management in the decline and future fate of the Pacific salmon and other native aquatic species of the Pacific Coast.

Due to the general and interdisciplinary nature of this subject, I could refer to a very large number of scientific citations for support. For clarity and brevity, I cite references sparingly in this testimony. Extensive literature citation and more detailed discussions occur within the general sources cited herein (copies attached). In this text I necessarily generalize about the overall context and patterns of salmon declines and the requirements for recovery, deferring detailed discussion of the physical and biological processes causing these phenomena to the cited sources. The best way to illustrate these processes is with photographs; I would be happy to make a slide presentation at a later time at the request of members or committee staff.

Resume and Qualifications

As a Research Ecologist on the faculty of Oregon State University since 1985, and earlier as a graduate student, I have conducted studies of the effects of human land uses on stream habitat and fish populations, and the development of appropriate conservation strategies and policies for salmon and other native fishes. I earned Ph.D. and M.S. degrees in fisheries science from Oregon State University, and my doctoral dissertation and master's thesis both concern the cumulative effects of logging and

other land uses on stream habitat and fish populations in western Oregon. I am principal author or coauthor of numerous journal articles, symposium contributions, and reports on this subject.

My current research ranges in scope from subcontinental-scale analyses of fish population distribution and trends in relation to land use activities, to detailed studies of fishes and their habitats in specific rivers. Between 1985 and 1992 I coordinated a research project investigating the role of human activities, primarily logging, road construction, and grazing on private and federal lands, in the deterioration of stream habitat and the decline of native salmon and trout populations in three regions of Oregon. This research was funded by the state of Oregon and the U.S. Fish and Wildlife Service Federal Aid for Sport Fish Restoration Program. In a related project, funded by the National Park Service, I developed a classification system helpful to assess the effects of grazing and other land uses on streams and riparian habitat in the Great Basin.

In 1991 I completed a year-long analysis of the effects of proposed management plans for the west-side federal lands of California, Oregon, and Washington, on water quality, fish, and aquatic biodiversity. That project and an ongoing study of the role of federal lands in sustaining salmon and other anadromous fish resources in the Pacific Northwest and California were supported by funds from The Wilderness Society. During the past year my studies have concentrated on the development of scientifically sound strategies for the restoration of riverine habitat, focusing on the role of public land watersheds in recovery of Pacific salmon and other declining aquatic biota. This work has been conducted with support by Oregon State University and the Pacific Rivers Council, with funding from several private foundations.

I am an active member of several scientific and professional organizations, including the American Fisheries Society, Ecological Society of America, Society for Conservation Biology, and North American Benthological Society. The professional societies have long been concerned with the apparent lack of integration and public disclosure of key scientific and technical information in the planning process for national forest, Bureau of Land Management (BLM), and other public lands. Since the mid-1980's I have reviewed forest plans and timber sale plans in the western states, and have helped prepare numerous detailed analyses, critiques, and appeal documents for the Oregon Chapter of the American Fisheries Society's effort to monitor public lands.

I have also been involved in efforts by the American Fisheries Society to develop proactive approaches to conservation of biological diversity and fishery resources on federal lands. For example, I have been a key member of the Oregon Chapter's Subcommittee for Biodiversity and Critical Areas, which has prepared a scientific protocol, and a state-wide inventory, with supporting maps and data base,

of watersheds and river reaches having high ecological integrity and high conservation value for sustaining sensitive aquatic species. This pioneering effort provided the initial prototype and template for the Scientific Panel on Late Successional Ecosystems' "Watershed Option," proposed to Congress in 1991 for protection of salmon and other aquatic species on federal lands in the Pacific Northwest.

Role of Habitat Deterioration in Salmon Declines

Obviously, salmon and other fishes are adversely impacted by many factors other than land use activities, from dams and fishing to fluctuations in the marine environment. At the least, deterioration of freshwater habitat synergistically aggravates problems caused by other factors, by limiting the ability of fish populations to adapt to and compensate for stressors elsewhere in their life cycle (see Bisson et al. 1991). In other cases, fishing and dams are clearly not an issue and it is extremely difficult to ascribe declines and extirpation in some fishes and sensitive amphibians to causes other than damage to freshwater habitat (Frissell 1991, Frissell in press).

It is important to keep in mind that the native freshwater fauna of the Pacific Northwest evolved under cold, wet conditions that prevailed during the Pleistocene period of about the past million years. During this period, forest or cold tundra-type conditions existed across most of the region. Fish species and other organisms adapted to cold, clean waters--the Pacific salmon and trout species, lampreys, and others--became widely distributed. Therefore the native aquatic fauna of this region, and thus its fishery resource, is largely dominated by animals that are inherently sensitive to the warming of surface waters, sedimentation of streambeds, and loss of channel stability and complexity that virtually always occur in response to disturbance and depletion of forest cover. Some species requiring extremely cold waters, such as the bull trout and tailed frog, were undoubtedly very abundant in the past, but now have receded and fragmented into small, isolated populations in mountainous headwater areas (see references in Frissell 1991, Frissell in press).

During the past century of development by European man, one of the most extensive changes on the landscape has been the logging and clearing of what once were old-growth and mature forests. Early development was concentrated in low-elevation areas, where many aquatic species were directly impacted by the loss of forest cover and simplification or outright destruction of natural estuaries, wetlands, floodplains, and riverine habitats. Human disturbance of forests occurs at frequencies and a spatial extent far in excess of natural disturbances such as wildfire and floods. Deforestation and accelerated forest disturbance, in conjunction with a sensitive native fauna, have contributed to widespread decline and fragmentation of the populations of fish and other aquatic animals (Frissell in press; Bisson et al. 1991).

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With the widespread loss of lowland habitats, salmon and other species have become increasingly isolated in less-disturbed headwater areas. Many if not most of these are on federally-owned lands. Today the management of lands in these steep, headwater basins disproportionately affects not only the sensitive aquatic species that find refuge there, but also water quality and habitat conditions in downstream areas. An overwhelming portion of the thousands of miles of riverine habitat in the Pacific Northwest lies downstream of federal lands, and the fate of these habitats depends directly or indirectly on the protection and management of those federal forests (Frissell 1991).

Salmon Habitat and Federal Land Management

Available scientific information strongly indicates that due to the a legacy of degraded freshwater habitat and depleted populations on private lands and developed public lands at lower elevations (e.g., Sedell and Everest 1990; other references in Frissell 1991), relatively undeveloped drainage basins and rivers on federal lands are critical in sustaining native salmon and other sensitive and declining aquatic species (Frissell 1991, and references cited therein; Oregon Chapter of the American Fisheries Society 1989).

Unfortunately, federal land management plans developed over the past 15 years target most of the last few relatively undeveloped watersheds for road construction and logging, with inadequate protection for stream channels, riparian forests and floodplains, and unstable or erosion-prone slopes. In most cases, roadless areas remain relatively undeveloped today exactly because they are steep and dominated by highly sensitive soils. Based on past experience, even with new forest plan standards and guidelines, proposed development and the soil loss it promotes is highly likely to cause severe degradation of habitat and water quality and to further jeopardize to the viability of fish populations both within and downstream of roadless areas and many other undeveloped lands (Frissell 1991, and citations therein). On such sensitive lands that serve as critical refugia for regionally depleted salmon and other species, there is no guarantee that even the more progressive logging methods proposed under the "New Perspectives" program can reduce logging-related damage to acceptable levels (Frissell et al. 1992).

Two critical factors compound the effects of deforestation and forest disturbance caused by logging, and also complicate their analysis--1) cumulative effects of past and new activities, and 2) the long time lag between slope disturbance and full expression of impacts to fish. Unfortunately these factors have been often overlooked or underestimated in the design of studies to evaluate effects of logging on aquatic resources, and in the planning of logging and road development. The first factor is that aquatic ecosystems have inherited the long-term, persistent effects of past practices, which due to very long recovery periods, cause ongoing or anticipated

activities to have additional cumulative or even synergistic impacts. For example, the depletion of large woody debris from streams due to logging in riparian areas, or the scouring and mass deposition in a stream channel caused by a landslide and large, downstream-moving debris flow, have effects that are large and irreversible over a period of many decades to centuries (Bisson et al, 1991, Frissell 1991). Because even limited new logging in these riparian areas will deplete what few conifer trees are left to replace the natural forest, even a limited activity will now have a large cumulative impact. Similarly, because extensive road networks and clearcuts have triggered widespread landslides and debris flows in the past, the few remaining undisturbed streams have important and increasingly rare values for fish and wildlife; even small incursions into these few remaining intact watersheds now can jeopardize a sensitive species over a large areas by threatening its only remaining secure habitat (Frissell 1993).

The second critical factor is that in many cases, continuing declines of sensitive fishes and other species indicate that these species have not yet adjusted to the loss of habitat caused by past human and natural disturbance. Even where new human disturbance has been abated, streams continue to suffer the effects of past activities. Many populations of salmon, for example, have likely been so depleted and fragmented by past human disturbance that they are likely to become extinct in the next decade or two. What this means is that we have not yet been held accountable for our past indiscretions in the management of rivers and the private and public lands in their watersheds. The situation will likely get worse before it gets better. It also means that when we err in land management, especially on steep and sensitive forest lands, the consequences can be biologically and physically irreversible. Therefore it is critical that we be extremely cautious and conservative in how we manage the last few streams that support abundant populations and high diversity of salmon and other native species. Until we have detected significant and persistent recovery of disturbed and degraded habitats elsewhere in the river system, we must jealously guard the last intact pieces of the ecosystem that we have left. These last pieces are largely located in roadless areas and other less-developed lands under federal ownership.

Failure of Federal Agencies to Respond Effectively

The problems outlined above have developed due to institutional biases and systematic neglect or suppression of scientific data and expert opinion, especially but not exclusively at regional offices and higher echelons in the agencies. This has occurred despite the best efforts of many local resource professionals. In some cases, good information has been assembled and disclosed, but decisions have been made heedless of the likely irreversible ecological consequences. In many other cases, however, sufficient expertise and institutional support heve not been made available within the agencies to allow for incorporation and full disclosure of accurate scientific information in resource management plans. Such agency dysfunctions lead directly

to frequent, continuing, and justified disruption of plans and projects by citizen appeals and litigation.

The primary response to date of the Forest Service, BLM, and other agencies has been to pour millions of dollars into adding artificial structures in an attempt to "fix" streams that have been damaged by logging and other land uses. These structures are exceedingly expensive, and most streams, because of cost or limited access, can never be treated (Bisson et al. 1991). Furthermore, where landslides, road failures, and similar watershed problems are persistent or ongoing, such structures have high failure rates, and a high incidence of adverse side effects (Frissell and Nawa 1992). This very expensive program amounts to cosmetic surgery, an unsuccessful attempt to treat and/or obscure the serious damage inflicted by logging and other development activities on stream ecosystems. In many national forest plans, artificial structures are portrayed as the principle driver of fish populations, and a primary means of mitigating the adverse effects of damage to water quality and fish habitat anticipated from the proposed timber program. Continuing or accelerating declines of coho salmon and many of the other target species are testimony to the failure of these programs. Funds for these ineffective programs should be transferred to new restoration projects that would eliminate the causes of habitat degradation and promote the recovery of natural ecological processes (Frissell and Nawa 1992, Frissell 1993 and references therein, Frissell et al. in press).

Steps Necessary for Recovery

To ensure the future of the Pacific salmon and other aquatic species, many major changes must be made in public lands management. Most of these changes are incorporated in certain alternatives of the 1991 report to Congress of the Scientific Panel on Late Successional Ecosystems. Among these changes are:

1) A moratorium on logging and construction of roads in watersheds having a major component of roadless area and other "critical areas" supporting high diversity or productivity of sensitive species. These critical areas should be identified based on (but not limited to) the lists and maps in the Scientific Panel on Late Successional Ecosystems' report to Congress, the Oregon Chapter of the American Fisheries Society's Critical Areas inventory, Dr. Peter Moyle's (University of California at Davis, Department of Fishery and Wildlife Biology) Aquatic Biodiversity Management Areas, and similar scientific sources.

2) National Forest- and BLM District-scale population viability analyses for anadromous fish and other sensitive species, based on historical and present-day distribution, abundance, and actual or potential threats to specific populations and subpopulations across all land ownerships within

major drainage basins. These studies should be conducted with the cooperation of the National Marine Fisheries Service, U.S. Fish and Wildlife Service, state wildlife and fish agencies, and university expertise. Based on these studies, long-range land management plans should be developed for each major river basin, containing provisions to ensure that all remaining natural populations of fish and other sensitive species are maintained and, where appropriate, recovered.

3) Improved standards for management of all federal lands, including wide, no-logging buffer zones along all streams; provisions for complete identification, mapping, and withdrawal from the timber base of all lands where logging and road construction are likely to lead to landslides, erosion, and damage to adjacent and downstream aquatic habitats; and limitations on road construction and re-construction.

4) Re-allocation of funds within fish habitat improvement, fish restoration, and similar programs, away from projects focused on installation of artificial structures and fish culture technology, toward projects and research focused on restoration of natural processes and ecosystem components. Such projects should promote self-restorative processes of aquatic habitat, riparian forests, and watershed and floodplain functions. Funds in road programs should be reallocated from construction and reconstruction to road obliteration and watershed restoration.

5) Improved comunication and between research and management branches of federal land management agencies.

8

Literature Cited

Bisson, P.A., T.P. Quinn, G.H. Reeves, and S.V. Gregory. 1991. Best management practices, cumulative effects, and long-term trends in fish abundance in Pacific Northwest river systems. Pp. 189-232 in R. J. Naiman, editor. Watershed Management: Balancing Sustainability and Environmental Change. Springer-Verlag, New York.

Frissell, C.A. 1991. Water quality, fisheries, and aquatic biodiversity under two alternative forest management scenarios for the west-side federal lands of Washington, Oregon, and Colorado. Report prepared for The Wilderness Society, Washington, D.C. 54 pp.

Frissell, C.A., and R.K. Nawa. 1992. Incidence and causes of physical failure of artificial fish habitat structures in streams of western Oregon and Washington. North American Journal of Fisheries Management 12:182-197.

Frissell, R.K. Nawa, and R. Noss. 1992. Is there any conservation biology in "New Perspectives?": A response to Salwasser. Conservation Biology 6(3):461-464.

Frissell, C.A. In press. Topology of decline and extinction of fishes in the Pacific Northwest and California. Conservation Biology.

Frissell, C.A., 1993. A new strategy for watershed restoration and recovery of Pacific salmon in the Pacific northwest. Draft report prepared for the Pacific Rivers Council, Eugene, OR. 20 January 1993. 31 pp.

Frissell, C.A., W.J. Liss, and D. Bayles. In press. An integrated, biophysical strategy for ecological restoration of large watersheds. Paper prepared for the proceedings of a symposium sponsored by the American Water Resources Association, "Changing Roles in Water Resources Management and Policy." 27-30 June, 1993, Seattle, WA.

Oregon Chapter of the American Fisheries Society. 1989. The status of threatened and rare native fish stocks affected by the Siskiyou National Forest Plan, and implications for aquatic biological diversity. Intervenor comment paper prepared for the Chief of the Forest Service on the matter of appeal #89-13-00-0130 on the Siskiyou National Forest Land and Resource Management Plan, filed by Natural Resources Defense Council et al. 19 pp. + appendices.

Sedell, J.R., and F.H. Everest. 1990. Historic changes in pool habitat for Columbia River Basin salmon under study fr TES listing. Draft report, USDA Forest Service, Pacific Northwest Research Station, Corvallis, OR. 7 pp.

Mr. VENTO. We would invite Mr. Higgins now to make his statement.

STATEMENT OF PAT HIGGINS

Mr. HIGGINS. Thank you. It is an honor to be here today. I am a fisheries biologist from northwestern California, and the case studies that I draw on here will illustrate that what Chris Frissell has said of areas further north is true in my area. I am active in my Humboldt chapter of the American Fisheries Society. I am a principal author of "Stocks at Risk in Northern California" which chronicles the extinction of Pacific salmon in our region. And the stated intent of that was to let people know where our problems lie and to win cooperation.

And the problems, certainly, in habitat in northwest California are linked to sediment. We have 60 feet in the Eel River and 30 to 50 feet in the Klamath. And I helped to write the Klamath River Plan and guided over $40 million in the 20-year restoration program, and it takes a similar approach. But there is no funding mechanism.

My trip to Washington has been sponsored by the American Ancient Forest Alliance because there is a growing recognition that the last existing salmon are dependent on the last existing forest.

I am currently working on a restoration action plan for the South Fork Trinity River, and why the salmon are becoming extinct. The Plumber Creek is the last viable juvenile-rearing habitat in a thousand mile sub-base basin. And the reason that Plumber Creek is functioning is that it has an undisturbed sub-basin called Jim's Creek. If Jim's Creek were cut, the lifeline for spring Chinook salmon in this basin would be severed, and we would lose the seeds of tomorrow for a thousand square miles in California, in the largest wild and scenic river.

There is pressure to cut the trees. Private land has been overcut. Six miles of forest in our area that is doing good in terms of watershed restoration models private lands as all-cut, every year and that's apt. It's apt. Unfortunately, the U.S. Forest Service lands and BLM lands are nested in devastated private timber lands in California. And you think you need to look to the EPA to have more teeth, but the Federal process has failed in California to protect public trust resources. We need legislative action to protect roadless areas because they harbor the seeds of the last remaining fish.

Immediate action is needed, and I am pleased to see that there is such strong interest because the threat of flood is real and we could lose the fish through sediment impact. But we need specialized inventories.

And I am going to turn the page and talk about institutional problems within the U.S. Forest Service and BLM to meet this problem with current staff. It is my understanding that we have on the order of 3,500 timber workers employed by the U.S. Forest Service at this point in the West; and there is a great temptation as timber cutters are reduced to move these key workers. And timber workers are now driving the fish and wildlife programs. These guys like to fish, but they are not capable of running these programs. If we do that over a large area, as we get watershed moneys

coming in, then this program will fail and the moneys will not be properly directed.

The Klamath National Forest got a national award last year for taking a proactive approach for keeping spring Chinook from being listed as extinct in the river. They spent $325,000 last year on a watershed approach to the Salmon River, similar to the approach that is being recommended here. They asked for $1.2 million this year and got $100,000. You've got to have the continuity.

Now, they are looking at possibly losing key staff because they don't have the continuity in budget. I understand that most of the money that is available to aquatic resources went to the consultation-type stuff. We have to get out of that box. We have to take a proactive approach. And I believe it is necessary that we take a legislative approach to this.

I have an example at BLM. BLM has holdings within the Mattole River watershed where there are stocks of chinook and coho salmon and BLM has inventoried the lands and found them to be in need of restoration, but yet has no funding. They also lost a key employee in that area because they leaned on him too hard for a land sale.

The Forest Service and BLM will now be competing for staff that is in really short supply, so they have to nurture that staff. And the biggest way to do that is a long-term commitment. I would recommend "no year money". If you give them targets, they will meet them artificially. I think PAC-fish is good. It is a founding document. It tells the ranger that there are people looking at the programs other than the people that they are meeting for lunch.

But we need—we have new supervisors in our force locally. But there is resistance at the staff level to the changes because of bureaucratic inertia. And I think it needs congressional direction. If your Republican colleagues were here, they would ask: Where is the money going to come from? I would suggest that this is infrastructure.

Mr. VENTO. The Democrats ask these questions, too. It is a changing role these days.

Mr. HIGGINS. I took a shot at them. I shouldn't do that.

Mr. VENTO. They may be perfectly willing to spend on every program like this. If you could wind up, because I want to get to Mr. Palmisano.

Mr. HIGGINS. I am. We need to preserve our soil capital to maintain productivity, and these fish are a resource. I am working on the South Fork of the Trinity; and in the plan that we are putting together there it suggests that fishery restoration can be a key part for revitalization in the rural communities.

[Prepared statement of Mr. Higgins follows:]

March 8, 1993

Honorable Bruce Vento, Chairman
National Parks, Forests and Public Lands Sub-Committee
House Natural Resources Committee
Rayburn Building, Office 2304
Washington, D.C. 20515

Dear Mr. Vento,

It is an honor and a privilege to be able to address the sub-committee on National Parks, Forests, and Public Lands. I am a consulting fisheries biologist with a specialty in salmon and steelhead restoration. My current project is to develop a restoration action plan for the South Fork Trinity River, as part of the Trinity River Restoration Program. I am a contributing author of the plan which guides the 20 year, $40 million federal program to restore salmon and steelhead to the Klamath River (USFWS 1991). As a member of the Humboldt Chapter of the American Fisheries Society, I served as the principal author of a white paper dealing with stocks of Pacific salmon in northwestern California that are at risk of extinction (Higgins et al. 1992). I will try to provide insight in my testimony as to how the U.S. Forest Service and Bureau of Land Management can prevent loss of salmon and steelhead stocks in northwestern California by embarking on an ambitious watershed restoration program.

In my work for the U.S. Fish and Wildlife Service (1991), I characterized the Klamath River as "severely ecologically stressed." Pools in the lower river have been filled in by 20-30 feet of sediment. The loss of cold water layers, which once existed in the depths of pools, now deprives salmon and steelhead of critical refuge areas as river temperatures rise to above 75 degree F in late summer. The estuary of the Klamath River has also been filled in resulting in loss of important rearing habitat for young chinook salmon.

All other major river systems in our area, with the exception of the Smith River, have similar problems to those described above. Sedimentation has occurred as a result of extremely unstable geologic conditions and intense rainfall coupled with disturbances related to timber harvest. Road failures during major storm events trigger mass wasting which contributes the bulk of sediment to stream channels. While management of U.S. Forest Service and Bureau of Land Management timber lands has improved in recent years, pressure to "get out the cut" to produce revenue has fragmented the forest in most watersheds and elevated erosion risk. Clear cut logging on private timber land in northwestern California continues on steep, unstable slopes, setting the stage for catastrophic soil loss in the event of another major storm. Active and abandoned logging roads on public and private land total over 10,000 miles in our region alone.

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Taking a Watershed Approach to Restoring Salmon and Steelhead

A comprehensive approach to watershed restoration is the only sound solution to preventing widespread stock losses of salmon and steelhead. Erosion risk must be reduced so that future flood events will not damage the last viable stream systems supporting these species. I support the concept being advanced by the Pacific Rivers Council as put forth by Dr. Chris Frissell, who joins me on this panel. Their approach is scientifically sound and very similar to the one proposed in the long range plan to restore the Klamath River (USFWS 1991). Refuge areas must be secured and then adjacent watersheds stabilized. By building on the solid foundation of the last good habitat that we have, we stand the best chance of achieving success.

In northwestern California, those streams that flow from Wilderness or Roadless Areas on U.S. Forest Service lands such as Smith River, Wooley Creek, Dillon Creek, Clear Creek, upper Blue Creek, lower Hayfork Creek, New River, and the North Fork Trinity River are the only systems that possess high quality fish habitat at this time. **The undisturbed Roadless Areas surrounding salmon and steelhead refuge habitats must be protected through legislation because they represent the last gene resources available for restoring Pacific salmon populations.**

Upper Blue Creek serves as a good illustration of why preservation of these areas is absolutely necessary. Blue Creek harbored 10,000 fall chinook salmon as recently as 1950. The race of fish had long been recognized as unique because of late run timing and large size. The creek suffered major damage in past floods and the lower watershed, which is on private land, has recently been extensively clear cut. In the last several years, the population has dropped to only 150 to 500 fall chinook salmon. These fish spawn exclusively in the canyon areas immediately below the Roadless Area on Six Rivers National Forest. Chinook have been almost completely eliminated from all other lower Klamath watersheds which are largely owned by private timber companies. Any disturbance in the USFS Roadless Area in the upper Blue Creek watershed increases the risk of extinction of lower Klamath fall chinook.

While there is a great deal of urgency because of the risk of losing salmon and steelhead stocks in future floods, all steps taken in erosion control and prevention must be well planned or the efforts may fail. Inventories must be conducted by highly skilled workers with a background in geology or watershed management. If people with no formal education in these disciplines are used in the field, then they must be extensively trained. Supervisorial staff must be adequate to conduct regular field checks to assure quality control. If the large amount of money required for this task is wasted, it will be tragic. Because of decreased timber

production, the USFS and BLM currently have a substantial surplus of workers that have been associated with timber harvest. These agencies must resist the temptation to use the resources allocated for watershed restoration to retain staff that is not capable of contributing to a successful watershed restoration program.

Both the USFS and BLM need time for accurate inventories and staff development so that watershed restoration can be done properly. Budget allocations should not set unrealistic targets that would lead to a lack of quality control. **Congress should stipulate that money allocated for this ambitious watershed restoration program is "no year money." This will allow a flexible time frame for various National Forests or BLM Districts to build a quality program and not be pressed into meeting arbitrary budget deadlines.**

The work of pulling culverts and obliterating sections of road can be done by displaced timber workers and equipment operators. **Some stipulation should be made in enabling legislation to favor small local contractors.** If fisheries restoration creates local jobs, then the community as a whole will support it. In addition to short term benefits of job creation, rural economies will ultimately be revitalized by tourism related to increased fishing opportunities.

Key Habitats For Salmon and Steelhead in Northwestern California

Discussions regarding refuge habitats for salmon and steelhead have largely centered on the work of Johnson et al. (1991). I believe that some watersheds critical to the preservation of salmon and steelhead stocks in northwestern California have been omitted. Conversely, some watersheds included as key habitats are too degraded to serve as centers of restoration. **On the Klamath National Forest, Grider Creek needs to be protected as critical habitat because its watershed is almost completely intact.** Juvenile chinook salmon of stocks that are at high risk of extinction, such as the Shasta River, may currently take refuge in lower Grider Creek because of its cool water temperatures. Because of its healthy watershed and stream conditions, Grider Creek may offer a unique opportunity as a control in future monitoring programs or studies. Beaver Creek, on the other hand, may be too degraded to be considered as a key watershed at this time.

Six Rivers National Forest has jurisdiction over critical salmon and steelhead habitat in the Mad River drainage which needs to be included in any key watershed designation. This river once produced over 5,000 chinook salmon annually but today the number is only several hundred. The majority of the watershed below the Six Rivers holdings is on private timber land and has been extensively clear cut in recent years. The last viable population of fall chinook salmon now spawn in the main river alluviated canyon

habitat below Pilot Creek. Although the Pilot Creek watershed lies within extremely erodible terrain, Six Rivers National Forest is planning a major timber harvest. An extensive road network exists already and poses a high erosion risk. It would be prudent to defer timber harvest and immediately implement erosion control in the Pilot Creek watershed. Major contributions of sediment from this watershed could eliminate the last of chinook salmon in the Mad River.

In the South Fork Trinity River drainage on Shasta Trinity National Forest, Miner Creek and Bear Creek should be designated as critical habitats for reasons similar to Grider Creek. These tributaries of lower Hayfork Creek may provide critical habitat for salmon and steelhead juveniles. Hayfork Creek can reach 80 degrees F during summer, but remnant runs of spring chinook and summer steelhead still hold during summer in some years in deep pools. the cold water that Miner and Bear Creek provide may be critical to the survival of these fish. The Pattison Roadless Area that includes Miner Creek and Bear Creek must remain undisturbed. Miner and Bear Creeks are also two of the last undisturbed watersheds in the entire South Fork Trinity River watersheds so should be preserved as control sites for any studies or monitoring programs.

Opportunities For Pilot Projects Taking a Watershed Approach in Northwestern California

Because a substantial amount of the research and testing of watershed restoration techniques has taken place in northwestern California, both the USFS and BLM may be ready to implement programs in the near term. Klamath National Forest has already formulated a plan to control erosion as an approach to restoring the Salmon River, which harbors that last viable population of wild spring chinook in the Klamath River. USFS personnel have worked closely with the community in developing a restoration plan and the community stands ready to participate. The Klamath Forest has also acquired help in assessing sediment potential from the Pacific Forest and Range Experiment Station in Arcata, California so early phases of erosion control activity could begin.

The Bureau of Land Management has also been working closely with community members interested in restoring chinook and coho salmon to the Mattole River. The native salmon of the river are recognized by the American Fisheries Society to be at high risk of extinction. The BLM has assessed the need for erosion control measures on land under its jurisdiction and could now proceed on a model project. BLM also needs to fill its fisheries staff position which has been vacated recently vacated.

Six Rivers National Forest has done erosion control assessment for many of its watersheds. This should enable the Forest to begin implementation of erosion control measures relatively quickly. Recent surveys of existing road networks in Pilot Creek showed that

there were numerous culverts with high diversion potential. Problems identified should be remedied as soon as possible to prevent further decline in habitat quality and fall chinook salmon in the Mad River. Some key watersheds listed in Johnson et al. (1991) such as Bluff Creek and Red Cap Creek have widespread disturbance associated with timber harvest. "Storm proofing" these watersheds is probably prudent to protect fall chinook stocks and summer steelhead.

The Shasta Trinity National Forest controls a substantial portion of the South Fork Trinity River watershed. Spring chinook, fall chinook, coho salmon, and summer steelhead are all at extremely low levels. A major factor in the decline of these fish has been sedimentation. Because the watershed is large and current assessments are incomplete, implementation of such a program in this basin may require longer lead time.

We are now faced with the very real prospect of widespread extinction of Pacific salmon stocks. As a nation, we are all concerned about our current budget deficit and what portion of that debt we will leave to our children. If we fail to act decisively, to save Pacific salmon, what will be the economic and cultural deficit that we leave to future generations? Congress should enact legislation to begin an ambitious watershed restoration program to prevent widespread loss of Pacific salmon stocks. The public recognizes the value of Pacific salmon and healthy river systems and will support sound solutions. The time for leadership has arrived.

Sincerely,

Patrick Higgins

References

Johnson, K.N., J.F. Franklin, J.W. Thomas, J.Gordon. 1991. Alternatives for Management of Late Successional Forests of the Pacific Northwest. Report for Merchant Marine and Fisheries Committee, U.S. House of Representatives.

Higgins, P.T., S. Dobush, D. Fuller. Factors Threatening Northern California Stocks With Extinction. Humboldt Chapter American Fisheries Society, Arcata, Calif.

U.S. Fish and Wildlife Service. 1991. Long Range Plan for the Klamath River Basin Fisheries Conservation Area. Klamath Field Office U.S.F.W.S., Yreka, Calif.

Mr. VENTO. Our concern is that we have to go over there and vote. But, Mr. Palmisano, I know it is unfair to ask to you summarize your statement. Please try and do so now, and probably we will leave it at that.

STATEMENT OF DR. JOHN F. PALMISANO

Mr. PALMISANO. Mr. Chairman and the subcommittee members, thank you for the opportunity to address the subcommittee. I am an independent fishery scientist from Portland, Oregon. I have a Ph.D. in fisheries from the University of Washington in Seattle, and I am a certified fishery scientist. I have 20 years of professional experience in consulting, research, and teaching in the Pacific Northwest.

I am representing the Northwest Forest Resource Council of Portland, Oregon. The council and I feel strongly that before solutions can be applied to the salmon problem, the problem must be thoroughly defined. Only after knowing the causes can the solutions be proposed and fairly implemented.

In the last 12 months, I have coauthored two scientific studies that reviewed the factors that have adversely affected Pacific Northwest salmon stocks. The first report was prepared for the Oregon Forest Industry Council in June 1992. And the second report was prepared in January 1993 for the Washington Forest Protection Association and the Washington State Department of Natural Resource.

The sole objective of both studies was to provide a thorough and honest evaluation of all factors that have adversely affected the wild anadromous stocks of Pacific Northwest salmon and trout.

Our finding showed that no single factor but rather a multitude of factors, including forestry, contribute to the reduction of abundance of wild anadromous salmon trout. We identified two major categories of factors, environmental and fisheries management. Environmental factors included water-use and land-use practices, natural phenomena, and biological interactions. Fisheries management factors included agency policies and actions, harvest, and hatchery practices.

We found that wild fish abundance was reduced by lost productivity caused by habitat loss and degradation, by additional mortality caused by environmental and by fisheries management factors, and by changes in fish size and genetics caused primarily by fisheries management practices.

Both reports present a balanced and comprehensive scientific review of the factors that have led to the decline of salmonid runs in Oregon and Washington. The reports identify the following as significant contributors to the decline of Pacific Northwest salmon populations: Permissive salmon management policies; overfishing and inadequate spawning escapement; major irrigation, hydropower, and flood control projects; intensive land use practices; predation; and climatic factors.

If we want to solve the salmon problem, we must be aware of very important information. Anadromous salmon and trout of the Pacific Northwest have a complex life history. These fish require freshwater, marine, and estuary habitat. They are vulnerable to adverse impacts in areas other than the freshwater environment.

The migration takes them out of local jurisdiction and exposes them to fisheries and predators in California Oregon, Washington, Alaska, Canada, and the high seas.

No single factor, but a multitude of fisheries management and environmental factors affect the abundance and health of these fish.

Industrial and urban development and associated increases in human population have contributed to the decline of salmonid populations in the Pacific Northwest. It is unrealistic to expect the same number of fish in 1990s as occurred in 1890.

Of all factors considered, fishing is the most responsible for direct and indirect fish mortality.

While salmonid populations have been decreasing, populations of some major predator species of marine mammals and sea birds, which are protected by federal laws, have been increasing. West Coast populations of harbor seals and California sea lions has been increasing between 4 and 12 percent per year.

The most productive habitats for fish rearing occur in the flood plains and estuaries of rivers. These areas have long been cleared of trees and other vegetation and are now altered and used for agriculture, highways, railroads, navigation, ports, marinas, flood control, water diversions, and development of urban, industrial, and recreational complexes. These areas have relatively new regulations that protect fisheries and little chance of returning to nature.

The least naturally productive habitats for fish rearing occur in streams in upland areas that are normally forested. These areas have steep gradients and the streams have narrow channels and rapid flow rates. Forest practices are regulated more than any other land or water use practice. Yet these areas, although managed, are maintained as vegetated landscapes.

Further improvements in freshwater habitats may not result in increased salmonid abundance unless similar improvements occur in important estuarine habitat, which now may be limiting. At the same time, similar improvements, which may now be limited in some solutions to the salmon problem, have to be based on sound, scientific information gathered from all areas inhabited by these fishes.

I thank you for the opportunity, and both reports that I mentioned have been submitted for my testimony.

[Prepared statement of Dr. Palmisano and reports submitted for the record follow:]

March 11, 1993

UNITED STATES HOUSE OF REPRESENTATIVES
Natural Resources Subcommittee
Representative Bruce F. Vento, Chairman
2253 Rayburn
Washington, D.C.

RE: Formal Comments on the Impact of Timber Harvest to Pacific Northwest Salmon

Dear Chairman Vento:

Thank you for the opportunity to address the Subcommittee. My name is John F. Palmisano. I am an independent fisheries scientist from Portland, Oregon. I have a Ph.D. in Fisheries from the University of Washington, in Seattle, and I am a Certified Fisheries Scientist. I have 20 years of professional experience in consulting, research, and teaching in the Pacific Northwest.

I am representing the Northwest Forest Resource Council (NFRC) of Portland, Oregon. The Council's members are timber companies that depend upon natural resources and own and manage much salmon habitat in Oregon and Washington. Furthermore, the Council strongly believes that the recovery of salmon runs is very important to all residents of the Northwest. Accordingly, the Council has an immense interest in the Subcommittee's hearings and believes that it is appropriate to comment on the issues that will affect the recovery of salmon runs and influence the management of forested lands.

The Council and I feel strongly that before solutions can be applied to the salmon problem, the problem has to be thoroughly and accurately defined. Only after knowing all the major causes can the appropriate solutions be proposed and fairly implemented.

In the last 12 months I have coauthored two scientific studies that reviewed the factors that have adversely affected Pacific Northwest stocks of wild anadromous salmon and trout. The first report, A Review of Management and Environmental Factors Responsible for the Decline and Lack of Recovery of Oregon's Wild Anadromous Salmonids was prepared for the Oregon Forest Industry Council in June of 1992 by Drs. V.W. Kaczynski and J.F. Palmisano. The second report, The Impact of Environmental and Management Factors on Washington's Wild Anadromous Salmon and Trout was prepared in January 1993 by Drs. John F. Palmisano, Robert H. Ellis, and Victor W. Kaczynski for the Washington Forest Protection Association and the Washington State Department of Natural Resources. We present these reports as part of our formal comments and strongly encourage the Subcommittee to read them.

The sole objective of both studies was to provide a through and honest evaluation of all factors that have adversely affected the wild anadromous stocks of Pacific Northwest salmon and trout.

Not surprisingly, our findings showed that no single factor, but rather a multitude of factors, including forestry, contributed to the reduced abundance of wild anadromous salmon and trout in Oregon and Washington. We identified two major categories of factors, environmental and fisheries management. Environmental factors included water-use and land-use practices, natural phenomena, and biological interactions. Fisheries management factors included agency policies and actions, harvest, and hatchery practices.

We found that wild fish abundance was reduced by lost productivity caused by habitat loss and degradation, by additional mortality caused by environmental and fisheries management factors, and by changes in fish size and genetics caused primarily by fisheries management practices.

Both reports present a balanced and comprehensive scientific review of the factors that have lead to the decline of salmonid runs in Oregon and Washington. The reports identify the following as significant contributors to the decline of Pacific Northwest salmon populations:

- o Permissive salmon management policies
- o Overfishing and inadequate spawning escapement
- o Major irrigation, hydropower, and flood control projects
- o Intensive land use practices
- o Predation, and
- o Climatic factors.

The reports also provide information on impacts such as:

- o Changes in ocean survival of fish
- o Increases in the populations of salmon predators and competitors, such as marine mammals, including seals and sea lions, American shad, and northern squawfish o Changes in the Columbia-Snake River aquatic environment
- o Loss of river and estuary habitat and food supply, and
- o Large influx of hatchery produced fish into the system.

Again, thank you for the opportunity to comment. We hope that our findings will be helpful.

Respectfully,

Dr. John F. Palmisano

For The NORTHWEST FOREST RESOURCE COUNCIL

Important Considerations About Causes Of Decline In Northwest Salmonid Populations

1. Anadromous salmon and trout of the Pacific Northwest have a complex life history. These fish require freshwater, marine, and estuary habitat. (An estuary is an arm of the sea at the mouth of a river; it contains a mixture of fresh and salt water.) Thus, they are vulnerable to adverse impacts in areas other than the freshwater environment.

2. The migratory nature of many of these fish takes them out of local jurisdiction and exposes them to fisheries in California, Oregon, Washington, Alaska, Canada, and the high seas.

3. No single factor, but rather a multitude of fisheries management and environmental factors affect the abundance and health of these fish.

4. Industrial and urban development and associated increases in human population have contributed to the decline of salmonid populations in the Pacific Northwest.
It is unrealistic to expect the same number of fish in the 1990s as occurred in the 1890s.

5. Of all factors considered, fishing is the most responsible for direct and indirect fish mortality.

6. While salmonid populations have been decreasing, populations of some major predator species of marine mammals and sea birds, which are protected by federal laws, have been increasing. Since the Marine Mammal Protection Act was passed in 1972, West Coast populations of harbor seals and California sea lions have been increasing between 4 and 12 percent per year.

7. The most productive habitats for fish rearing occur in the flood plains and estuaries of rivers. These areas have long been cleared of trees and other vegetation and are now altered and used for agriculture, highways, railroads, navigation, ports, marinas, flood control, water diversions, and development of urban, industrial, and recreational complexes. These areas have relatively few regulations that protect fisheries and little chance of returning to nature.

8. The least naturally productive habitats for fish rearing occur in streams in upland areas that are normally forested. These areas have steep gradients and the streams have narrow channels and rapid flow rates. Forest practices are regulated more than any other land or water use practice. Yet these area, although managed, are maintained as vegetated landscapes.

9. Replacement in streams of large woody debris, previously removed from logged areas by agency decree - but now known to be important for fish habitat, will takes years to decades to effectively recreate much needed rearing and feeding habitat.

10. Further improvements in freshwater habitats may not result in increased salmonid abundance unless similar improvements occur in important estuarine habitat, which now may be limiting.

Summary Presentation

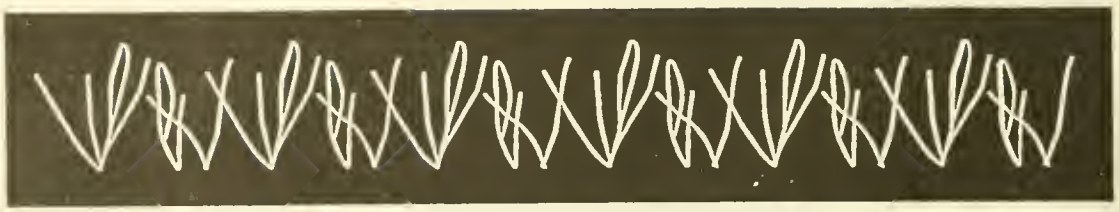
The Impact of Environmental and Management Factors on Washington's Wild Anadromous Salmon and Trout

Prepared for:

Washington Forest Protection Association and
The State of Washington Department of Natural Resources,
Olympia, Washington

John F. Palmisano, Ph.D.
Robert H. Ellis, Ph.D.
Victor W. Kaczynski, Ph.D.

March 1993

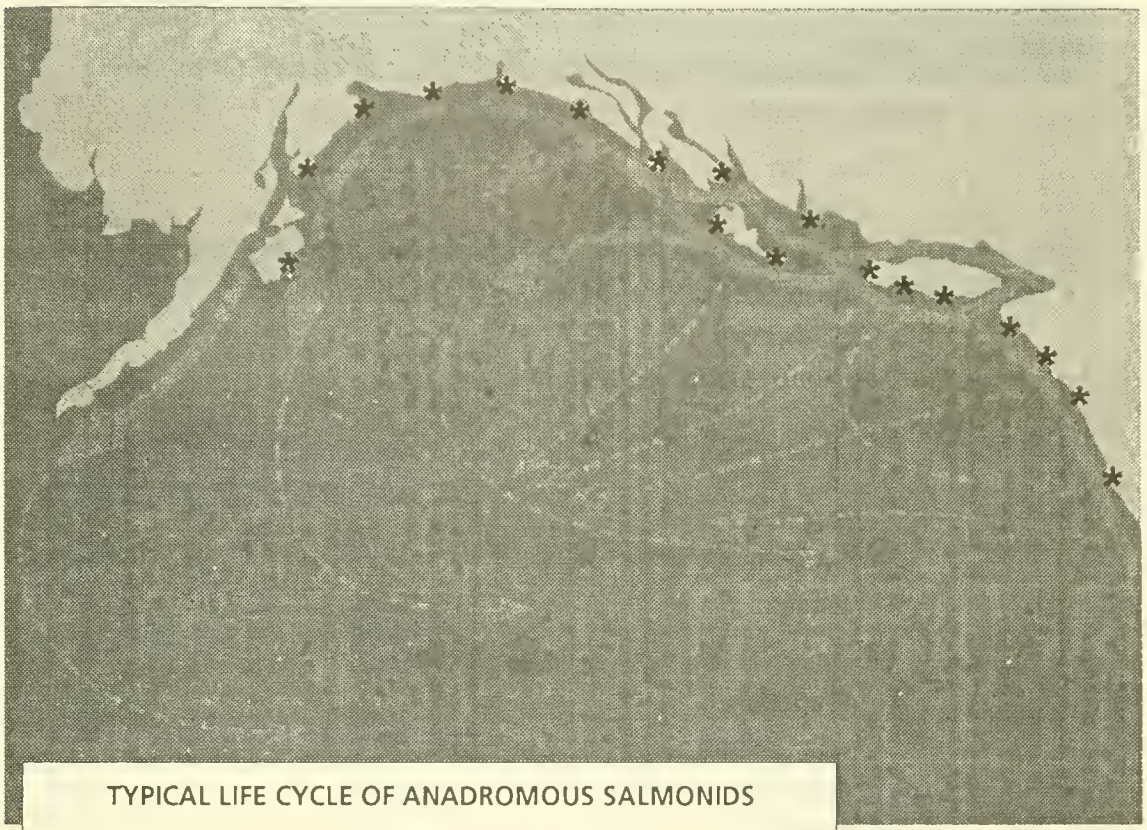


Abstract

A review and analysis of available information indicate that several factors, acting now or in the past, have reduced the abundance of Washington's native and wild anadromous species of salmon and trout in the Columbia River, Puget Sound, and coastal fisheries. Environmental factors, which include water- and land-use practices, human-influenced biological interactions, and natural phenomena, have affected the success of migration, spawning, growth, and survival of wild fish. Management factors, which include fishery agency harvest and hatchery practices, have affected the numbers and genetic makeup of wild fish that can return to streams and rivers to spawn. Recent fishery statistics, including in-river run size, compliance with established spawning escapement goals, and stock composition, confirm these effects. Many, but not all of Washington's salmonid stocks have a dominant hatchery component. Sockeye and pink salmon are almost exclusively wild fish. Stocks of chum salmon and sea-run cutthroat trout have more wild than hatchery fish, while stocks of coho and chinook salmon and steelhead trout are mostly hatchery fish. The reallocation in catch from ocean mixed-stock preterminal fisheries to coastal and Puget Sound terminal fisheries has helped protect declining wild stocks even though Canadian interception of Washington chinook and coho salmon has increased the total harvest rates for these species above desired levels. However, Washington's interception of Canadian sockeye and pink salmon has more than compensated for these losses. Pink salmon, whose juveniles spend less than 8 days in fresh water, and sockeye salmon, almost exclusively from Canada, account for almost 60 percent of Washington's commercial salmon catch. The majority of this catch, therefore, is composed of wild fish little influenced by the state's freshwater environment. Thus, the harvest of hatchery-produced fish and continued interception of Canadian stocks have enabled the statewide commercial salmon catch to remain at historical levels of about 50 million pounds per year.

Columbia basin fisheries have been affected most severely. Water-use practices (primarily dams and irrigation diversions) and human-influenced biological interactions are the primary factors contributing to stream blockage, degradation of freshwater and estuarine habitat, increased mortality, and markedly reduced run size. Fewer than 25 percent of these salmonids are wild fish. Puget Sound fisheries are in somewhat better condition: more than 50 percent of these salmonids are wild. However, past water-use and land-use practices, and a growing and sprawling human population have eliminated productive lower river and estuarine habitat. Washington's coastal fisheries have been least affected, although important freshwater and estuarine habitat has been lost. Forest and agricultural practices and localized urban-industrial impacts are the primary adverse factors. However, more than 75 percent of coastal salmonids remain wild.

TYPICAL MIGRATION PATTERN OF PACIFIC NORTHWEST SALMONIDS



1ST SUMMER
1ST FALL AND WINTER
MIXED-STOCK FISHERIES

TYPICAL LIFE CYCLE OF ANADROMOUS SALMONIDS

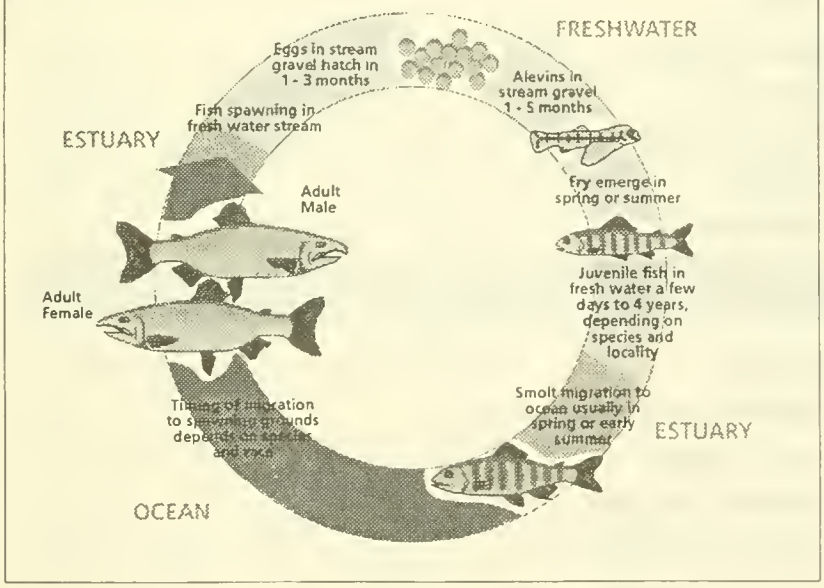


EXHIBIT 1

FACTORS THAT IMPACT ABUNDANCE OF WASHINGTON'S SALMON AND TROUT

ENVIRONMENTAL

- Water Use
  - Hydropower (Dams)
  - Irrigation
  - Flood Control
  - Navigation
  - Municipal and Industrial
- Land Use (Road Building)
  - Agriculture
  - Forestry
  - Urban-Industrial
  - Mining
- Biological (Natural and Human-Influenced)
  - Predation
  - Competition
  - Food Supply
  - Disease
- Natural Phenomena
  - Climate
  - Ocean Currents
  - Floods
  - Earthquakes
  - Volcanic Eruptions
  - Landslides

MANAGEMENT

- Spawning Escapement Goals
- Harvest Levels
- Hatchery Practices
- Treaties and Laws

REGIONAL IMPACTS

Environmental Factor	Columbia River	Puget sound	Coastal
Water-Use Practices	Primary	Secondary	Secondary
Land-Use Practices	Secondary	Primary	Primary

EXHIBIT 2

COMPOSITION OF WASHINGTON'S RECENT TOTAL SALMON CATCH
COMMERCIAL: 86% (37% NONTREATY; 49% TREATY) SPORT: 14%

RECENT DISTRIBUTION OF WASHINGTON'S COMMERCIAL SALMONID CATCH
PUGET SOUND: 81% COAST: 16% COLUMBIA RIVER: 3% (37%)*

	WASHINGTON		CANADIAN	
Average Annual Commercial Catch			**Source**	**Interception**
Pink	1,890,000	31%	50-75%	—
Sockeye	1,670,000	27%	99%	—
Coho	1,310,000	21%	—	1,400,000
Chum	678,000	11%	—	—
Chinook	510,000	8%	—	800,000
Steelhead	107,000	2%	—	—

Approximate Recent Annual Catch	**Salmon**
WA Interception of Canadian Salmon	2,900,000
Canadian Interception of WA Salmon	2,200,000
Net Washington Gain	+700,000

* 37% of the Columbia River commercial catch is landed by Washington fishermen while 63% is landed by Oregon fishermen

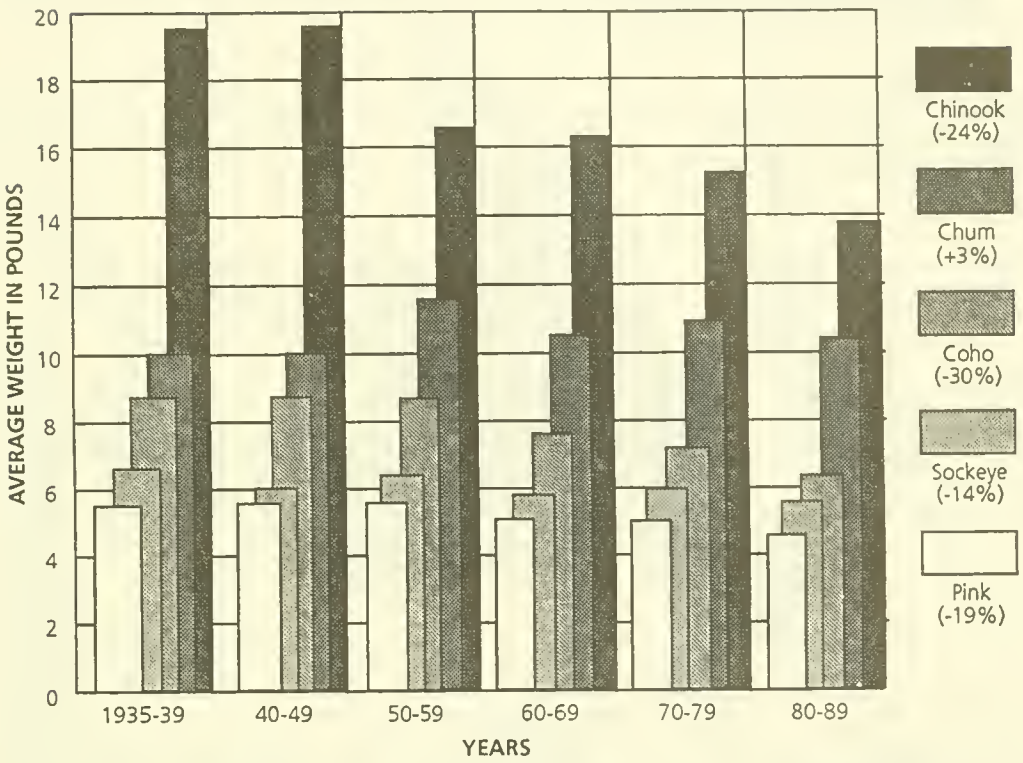
EXHIBIT 3

CURRENT WILD AND HATCHERY COMPOSITION OF SALMONID STOCKS IN THE THREE MAJOR BASINS OF WASHINGTON

Location/Species	Wild	Hatchery
State	<70%	>30%
Columbia River Basin	<25%	>75%
Puget Sound Basin	>50%	<50%
Washington Coastal Basins	>75%	<25%
Pink and Sockeye Salmon	>99%	<1%
Cutthroat Trout	>90%	<10%
Chum Salmon	>60%	<40%
Chinook and Coho Salmon	<50%	>50%
Steelhead Trout	<30%	>70%

EXHIBIT 4

REDUCED BODY SIZE OF SALMON COMMERCIALLY CAUGHT IN WASHINGTON



Measured Average Weight (in pounds) and Percent Change of five species of Pacific Salman Commercially Caught in Washington[a] between 1935 and 1989

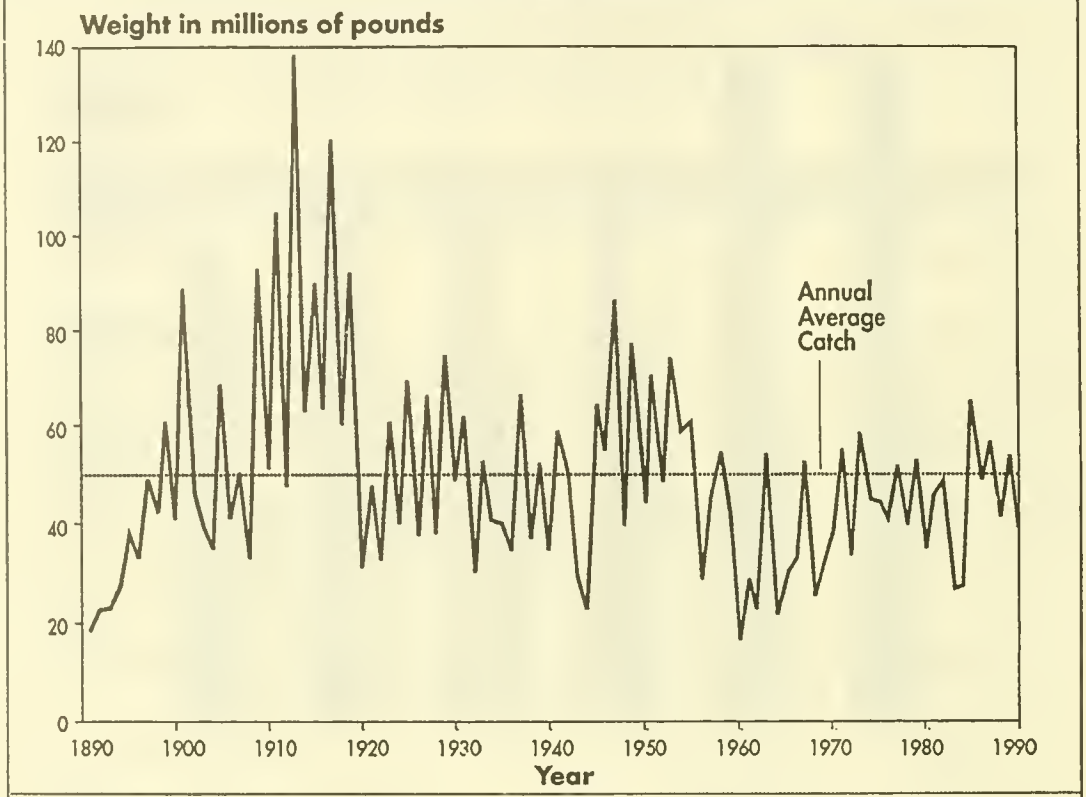
Time Period	Coho	Chinook	Pink	Sockeye	Chum	Total
1935-39	8.8	19.7	5.7	6.6	10.0	8.4
1940s	8.8	19.7	5.8	6.0	10.0	8.1
1950s	8.6	16.4	5.8	6.3	11.7	7.8
1960s	7.8	16.3	5.3	5.8	10.5	7.4
1970s	7.2	15.3	5.3	6.0	10.9	7.5
1980s	6.2	14.9	4.7	5.7	10.3	6.5
1935-1989 Change	-29.5%	-24.4%	-19.0%	-13.6%	+2.9%	-22.6%

[a]Coast, Puget Sound, and Columbia River

Source: WDF, 1991.

EXHIBIT 5

TOTAL COMMERCIAL LANDINGS OF SALMON IN WASHINGTON [a]



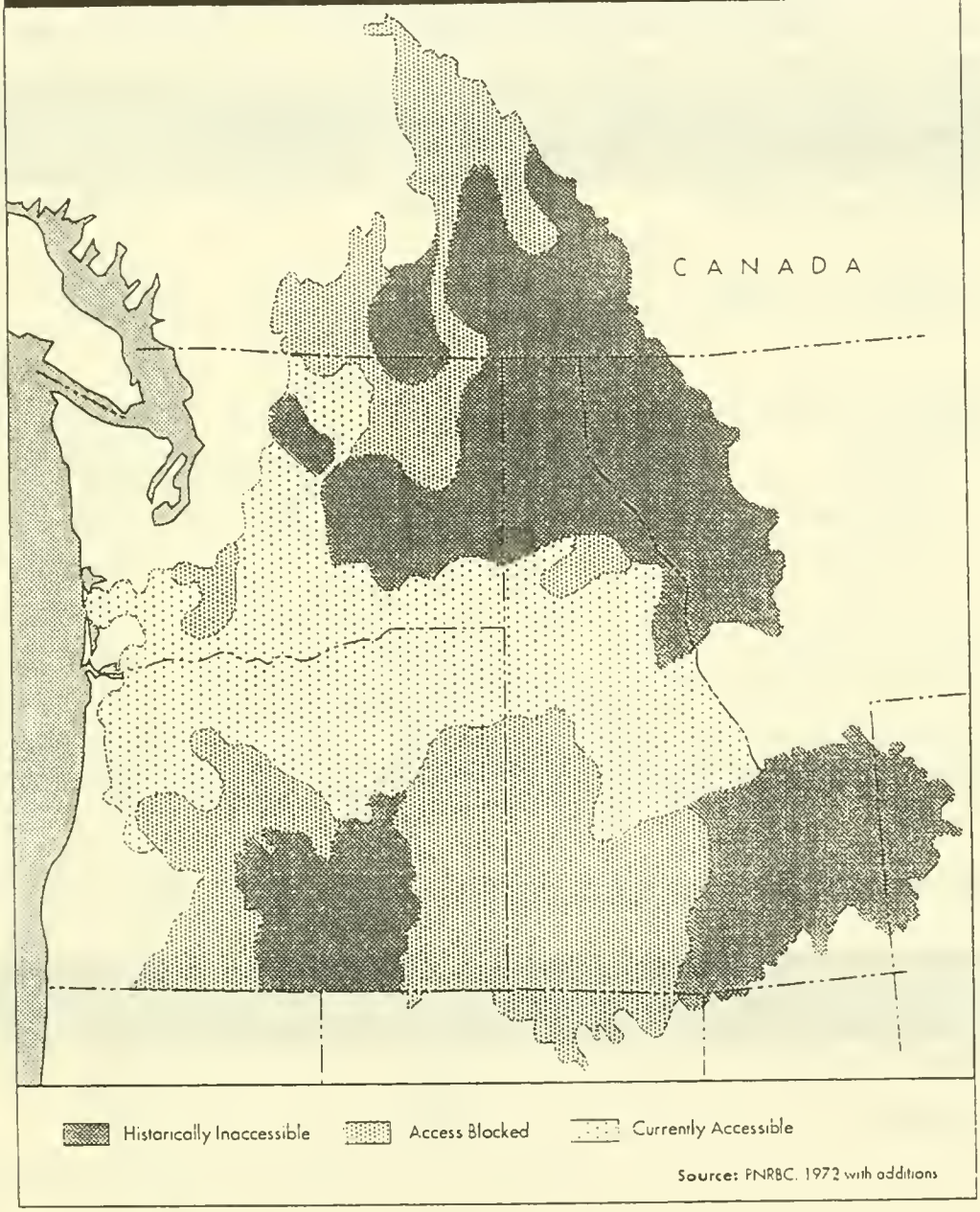
Note:
Average annual catch for the period of record is nearly 50 million pounds.

[a] Round weight in millions of pounds

Sources: WDF et al.,1973; WDF, 1991,1992d.

EXHIBIT 6

MAP OF COLUMBIA RIVER SYSTEM SHOWING AREA ACCESSIBLE TO SALMON AND STEELHEAD



LOST PRODUCTIVITY

Factor	Columbia Basin	Puget Sound	Coastal Region
River Miles Blocked	17%	5%	<1%
River Habitat Degraded	High	Medium	Low
Estuary Habitat Lost	40%	70%	<40%

EXHIBIT 7

WASHINGTON ADULT SALMONID MORTALITY

AVERAGE OF 1989 AND 1990 TOTAL SALMON CATCH 7,667,000 FISH

Summary of Estimated Adult Salmonid Losses Cause	Number Lost	Percent of Total 2-Year Average Catch
Total Marine Mammal	983,000	13%
Seal and Sea Lion Predation		(12%)
Seal Damage of Fish in Nets		(1%)
Total Indirect Fishery	192,000	2.5%
Shaker Loss		(0.4%)
Gillnet Dropout		(2%)
Sport Release		(0.1%)
Dam Mortality (C.R.)	164,000	2%
All	1,339,000	17.5%

1991-92 TOTAL STEELHEAD TROUT CATCH 200,100 FISH

Estimated Adult Incidental Losses Cause	Number Lost	Percent of Catch
Gillnet Dropout	3,200	2%
Sport Release	2,400	1%
All	5,600	3%

EXHIBIT 8

ATTAINMENT OF ESTABLISHED SPAWNING ESCAPEMENT GOALS IN WASHINGTON FOR WILD FISH FOR MOST RECENT PERIOD OF RECORD

Species	Coast	Puget Sound*	Columbia River	Total
Total Salmon	86% (12/14)	30% (24/79)	60% (3/5)	40% (39/98)
Steelhead	80% (4/5)	25% (2/8)	50% (1/2)	47% (7/15)
Total Salmonids	84% (16/19)	30% (26/87)	57% (4/7)	41% (46/113)

* Includes Strait of Juan de Fuca

DEPRESSED STOCKS

Salmon

Strait of Juan de Fuca: Chinook, Coho, and Pink

North Puget Sound: Most Chinook and Skagit River Coho and Sockeye

South puget Sound: All Coho and Lake Washington Sockeye

Hood Canal: All Coho and Most Chum

Columbia River: Summer and Some Fall and Spring Chinook, Wild Coho

Many Sea-Run Cutthroat and Some Columbia River Steelhead Trout

EXHIBIT 9

OPTIMUM HARVEST GOALS FOR WILD SALMONIDS: 40 TO 75%

	Recent Harvest Rates		
Washington Stocks	**Ocean**	**Terminal**	**Total**
Coastal Chinook	48%	34%	65%
Coastal Coho	51%	44%	71%
Puget Sound Chinook	71%	61%	87%
Puget Sound Coho	62%	72%	92%
Puget Sound Pink	—	37%	(37%)
Puget Sound Chum	—	70%	(70%)
Total Steelhead	—	69%	(69%)

	Recent Harvest Rates				
Columbia River Stocks	**Canada**	**Ocean US**	**Total**	**Columbia River**	**Total Harvest**
Lower River Fall Chinook	33%	61%	79%	32%	87%
Upper River Fall Chinook	32%	61%	80%	50%	93%
Coho	6%	56%	64%	55%	89%

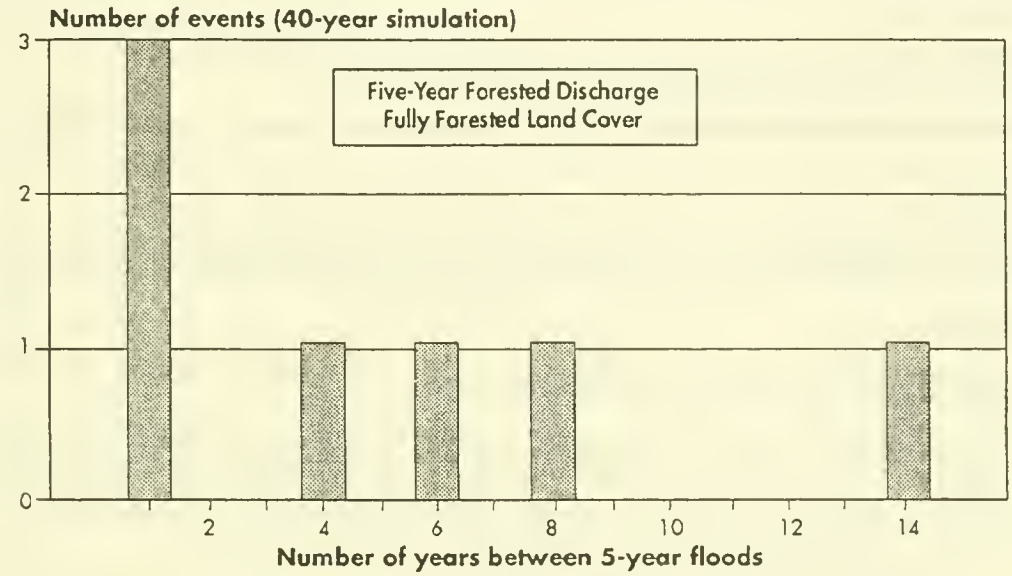
Note:

Harvest rates across columns are not additive; the rates depict the percentage of total available fish per stock harvested at each fishery location

EXHIBIT 10

FREQUENCY OF 5 YEAR FLOOD EVENT IN URBAN VS FORESTED AREAS

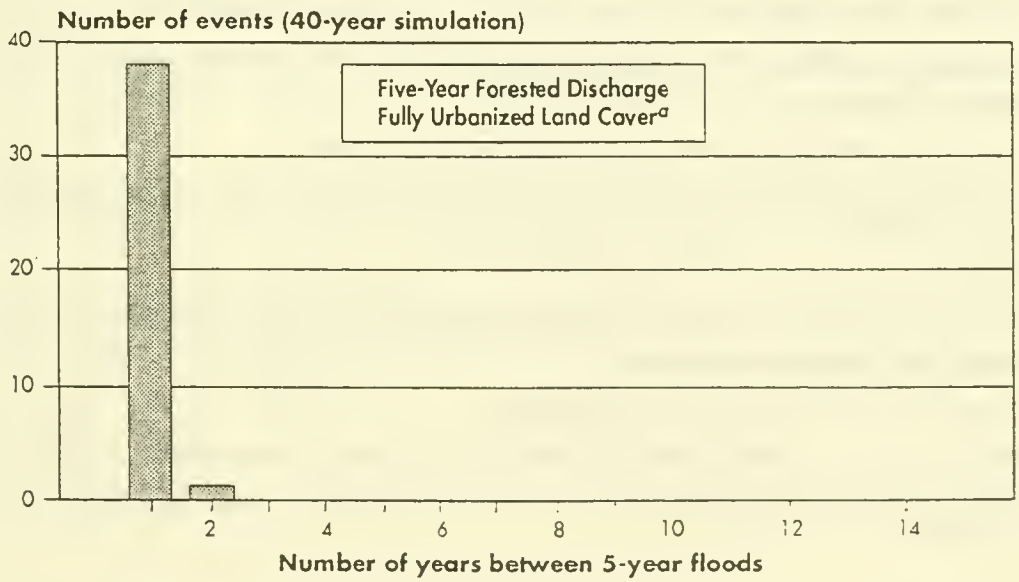
HSPF SIMULATION OF A SAMPLE BASIN IN SW KING COUNTY



Note:
Bars show the numbers of years separating discharge events of 5-year recurrence or greater.

Source: Booth, 1991.

HSPF SIMULATION OF A SAMPLE BASIN IN SW KING COUNTY



[a] About 40 percent effective impervious area.

Source: Booth, 1991.

EXHIBIT 11

RECOMMENDATIONS (PARTIAL LIST ONLY)

Management

- Manage salmonid populations to annually meet numerical spawning escapement goals and to keep harvest rates at levels that will perpetuate the fisheries.
- Continue to restrict mixed-stock fisheries and to promote and support terminal fisheries.
- Continue and expand hatchery production programs that are complementary to wild fish populations.
- Expand programs to determine the current degree of salmonid predation and competition by marine mammals (seal and sea lion) and American shad, and evaluate potential measures.

Forestry

- Continue research effort under the Timber, Fish, and Wildlife Agreement (TFW) and modify forest practices regulations as indicated by the results.
- Actively manage degraded riparian zones, including cattle grazing lands, to encourage development of characteristics that will promote the reestablishment of a productive habitat.
- Establish a cooperative effort between state agencies and forest landowners to identify, prioritze and solve problems related to past forest practices, including:
  - Culverts hindering upstream passage of fish
  - Abandoned roads in unstable areas
  - Road surface drainage entering fish-bearing streams

Agriculture

- Institute management regulations that contain stream and riparian protection rules.
- Achieve fish-screening protection, especially at pumped water diversions.
- Encourage irrigation water conservation and work to increase instream water for salmonids.

Municipal-Industrial

- Encourage water conservation for municipalities and industries.
- Manage stream-based water quality, including waste load allocations for both point and nonpoint sources.

Hydropower

- Improve technologies to minimize operational impacts of hydroelectric projects.

Dredge, Fill, and Flood Control

- Prevent further river and estuary habitat losses.

Mining

- Regulate and minimize aggregate extraction from all anadromous salmonid rivers and streams.

JOHN F. PALMISANO, Ph.D.

FISHERIES BIOLOGIST

EDUCATION

Ph.D., Fisheries-Ecology, University of Washington, Seattle.
M.S., Fisheries Biology, Utah State University, Logan.
B.S., Biology, University of Wisconsin, Stevens Point.
B.S., Conservation, University of Wisconsin, Stevens Point.

EMPLOYMENT

Dr. Palmisano has almost 20 years of professional fisheries experience in the Pacific Northwest as consultant, researcher, and teacher:

- o John F. Palmisano Biological Consultant, Beaverton, Oregon, March 1988 to present, Owner.
- o CH2M HILL, Bellevue, Washington, January 1978 to October 1988, Fisheries Scientist.
- o National Marine Fisheries Service, Fisheries Laboratory, Auke Bay, Alaska, July 1975 to March 1977, Marine Biologist.
- o University of Washington, College of Fisheries, Seattle, Washington, June 1977 to January 1978, Acting Professor.
- o Western Washington State University, Department of Biology, Bellingham, Spring: 1975 and 1977, Instructor.

SELECTED EXPERIENCE

- o Senior author of technical report on impacts to salmonids in Washington.
- o Coauthored technical report on decline of salmonids in Oregon.
- o Reviewed Lower Columbia River environmental factors and their effect on salmonid populations for area Public Utilities.
- o Led forebay trap study of downstream migrant salmon and steelhead trout smolts at Rocky Reach Dam.
- o Conducted salmonid fingerling bypass study at Rock Island Dam.
- o Prepared fisheries section for Columbia Basin Draft Environmental Impact Statement.
- o In charge of fish husbandry and rearing technology for the Tulalip Tribes' salmon hatchery near Marysville, Washington.
- o Managed testing program for bioassays with juvenile salmon for ARCO's Ferndale, Washington, Plant.
- o Wrote operational manual for the McCall, Idaho, summer chinook salmon hatchery for the Idaho Fish and Game Department.
- o Reviewed fisheries resources of the Snake River in Idaho.
- o Designed and conducted salmonid population survey of over 30 streams in the Flathead Indian Reservation in Montana.
- o Senior reviewer of technical reports on the impact of the Exxon Valdez oil spill on Prince William Sound salmon.
- o Biological liaison to the Alaskan Southern Southeast Regional Aquaculture Association for design of Ketchikan salmon hatchery.

PUBLICATIONS

Dr. Palmisano has prepared over 100 project reports and has published several technical and popular papers about marine mammals and salmonids in journals such as Science, Ecology, and BioScience.

PROFESSIONAL CERTIFICATION

Fisheries Scientist - No. 1,798, by the American Fisheries Society.
Senior Ecologist, by the Ecological Society of America.

PROFESSIONAL ORGANIZATIONS

American Fisheries Society
American Institute of Fisheries Research Biologist, Past Co-President of Seattle Chapter
Ecological Society of America
Pacific Estuarine Society

Executive Summary and Comparisons of Two Pacific Northwest Studies on the Decline of Wild Anadromous Salmon and Trout

TECHNICAL REPORTS REVIEWED:

A Review of Management and Environmental Factors Responsible for the Decline and Lack of Recovery of Oregon's Wild Anadromous Salmonids

Prepared for: Oregon Forest Industries Council, Salem, Oregon

Prepared by: V.W. Kaczynski, Ph.D. and J.F. Palmisano, Ph.D.
With Assistance from J.E. Levin, MS
June 1992

And

The Impact of Environmental and Management Factors on Washington's Wild Anadromous Salmon and Trout

Prepared for: Washington Forest Protection Association and the Washington State Department of Natural Resources, Olympia, Washington

Prepared by: J.F. Palmisano, Ph.D., R.H. Ellis, Ph.D. and V.W. Kaczynski, Ph.D.
January 1993

Submitted
by
John F. Palmisano, Ph.D.

For The Northwest Forest Resource Council
March 11, 1993

EXECUTIVE SUMMARY

INTRODUCTION

Results of two studies, one conducted in Oregon and the other in Washington, showed that similar conditions have lead to the decline in abundance of native populations of anadromous salmon and trout (salmonids). Pacific Northwest salmonid populations have been affected by several factors acting in concert. These factors can be grouped into management and environmental categories:

Management
- o Harvest
- o Agency Policies and Actions
- o Hatchery Policies and Actions

Environmental
- o Water Use
- o Land Use
- o Natural Phenomena

In recent times, the management factors are inseparable.

MANAGEMENT

Historical overfishing reduced coastal, Puget Sound, and Columbia-Snake River salmonid populations. Columbia River stocks have been depleted the most. Overfishing clearly extended into the early 1960s and is occurring today. A large hatchery program began in the 1960s and has continued development to the present. Many hatcheries were designed to mitigate large areas of salmonid habitat lost to development and operational impacts of water use-projects. Today, there is no other way to mitigate such large losses to native salmonid fisheries. Hatcheries were also constructed and operated to enhance catch at levels higher than wild-spawning populations could sustain. Fish agency policy was to maximize catch and this policy continued through the late 1980s. Currently, the harvest policy has been in transition to a wild fish management policy.

Hatchery fish mingle with wild fish in near coastal waters and are caught there in a mixed-stock fishery. Coho salmon from hatcheries comprise about 75 percent of the coho salmon in nearshore Oregon ocean waters. Columbia River, coastal, and Puget Sound coho and chinook salmon have been caught at 70 to 90 percent exploitation rates in the last few decades. These rates are sustainable for a hatchery-based fishery by are excessive for a wild-spawning based fishery that generally should not exceed 60 percent for maximum sustainable yield.

The decline of wild coho salmon in the lower Columbia River and coastal streams has been

attributed to high harvest rates by commercial and sport fishing stimulated by great abundance of hatchery coho salmon. From 1970 through 1989, the survival from fisheries to spawning escapement of coho salmon in the OPI (Oregon Production Index area form north of the Columbia River south into California) for combined ocean and Columbia river fisheries, averaged only 16 percent.

Overfishing of OPI coho salmon stocks was recognized in the late 1970s and a formal escapement goal of 200,000 adults was set in 1979. This was based on long term biological sustainable yield. The 200,000 spawner goal was met only in one of the past 13 years (1984) and was close in two years (1985 and 1986). It is important to note that in each year that the spawning escapement goal was not met, catch exceeded the goal by a factor of 2 to 5.

In contrast to coho salmon underescapement problems, spawning escapement goals for Oregon north coastal and Columbia River fall chinook salmon have generally been met. Spawning escapement goals for the Klamath River fall chinook, important in southern Oregon ocean harvests, have only been met in 2 of the past 13 years. From 1978 through 1990, spawning escapement averaged less than half of the biological escapement goal. Harvest rates in the ocean have been excessive. In addition, targeted harvest of relatively abundant Columbia fall chinook salmon has adversely affected the Snake River fall chinook salmon stock. By comparison, only 30 percent of Puget Sound stocks have met established spawning escapement goals while 84 percent of Washington coastal stocks have met their goals.

In addition to aggravating mixed-stock fishery problems, hatcheries have outplanted fry and smolts to various steams and used brood stocks that were from other geographic areas. Hatchery-produced adults escaped fisheries and hatchery weirs and strayed to other streams. The result was hybridization between native and hatchery stocks. The native coho salmon gene pool in coastal-OPI-area coho salmon populations is probably near extinction, and the lower Columbia River native gene pool is virtually extinct. The estimated percentage of hatchery fish in coastal chinook salmon populations ranges from 10 to 40 percent.

Today most, though not all, Pacific Northwest salmonids are hatchery produced fish. Over 75 percent of all Columbia River salmonids are hatchery fish. In Washington, about 30 percent of the fish are from hatcheries. In Puget Sound almost half of the fish are from hatcheries while on the coast less than 25 percent are hatchery fish.

ENVIRONMENTAL

Water Use

Of the environmental factors that have adversely affected native salmonid populations, water use is clearly the most serious, especially in the Columbia basin. Water use includes flood control, irrigation, hydropower, navigation, municipal, industrial, rural household, stock, and recreational uses. Our society competes with wild salmonids for limited water supplies throughout the state. Flood control, irrigation, and hydropower are inseparable for larger water

use projects.

From 30 to 60 percent of historical anadromous salmonid spawning habitat in the Columbia basin has been lost forever because of water-use projects. Remaining habitat has been degraded by water and land use. About one-third of historical anadromous habitat has been lost in Oregon and about 17 percent in Washington. Where upstream passage has been provided, effectiveness of this passage is a problem. The best available estimate of upstream passage failure in about 10 percent per project (dam and reservoir) for the Columbia and Snake rivers. This includes direct and indirect mortalities. Cumulative upstream mortality for adult salmon passing six dams to return to the Imnaha River in Oregon, as an example, is about 60 percent.

Downstream passage for juveniles is even more perilous. Cumulative mortalities at Columbia-Snake River projects for Snake River basin salmonids can exceed 90 percent. Turbine mortalities are about 11 percent per project and reservoir mortalities are about 1 percent per mile of reservoir.

A large percentage of summer runoff is diverted for agriculture irrigation throughout the Pacific Northwest. Seasonal availability is insufficient to meet human use demands, and fish needs are secondary to human use. Irrigation is the dominant consumptive use. Water flows in streams are significantly reduced, which reduces salmonid stream habitats. At present, only 2 percent of 56,000 diversions in Oregon that potentially affect fish are screened. Some 3,200 priority unscreened diversions have been identified in the state. Although not as bad, the problem does exist in Washington. It is difficult to assess juvenile salmonid diversion losses to agriculture and other diverted uses, but probably billions of anadromous fish have been lost. In addition, flow reductions increase summer temperatures in streams and increase the concentrations of pollutants. Warmer temperature cause chronic stress in salmonids and promote pathogen infections. Several authors concluded that water developments in the Columbia basin have altered the physical-chemical environment so that conditions are now suboptimal for salmonids and more optimal for disease pathogens and predators.

Local flood protection measures have destroyed hundreds of acres of flood plain riverine habitats and shallow estuary habitats. Historically, these were very productive nursery habitats. Ninety percent of estuary losses were related to diking that was used to create and protect agricultural lands.

Water-use impacts in the Columbia basin have been severe, and these developments have seriously reduced the number of native anadromous salmonids and limited their potential recovery. The area above Bonneville Dam has the highest proportion of salmonid stocks with decreasing spawning escapement trends.

Land Use

Land use-impacts are secondary to water use-impacts for native salmonids in the Columbia basin but are the major source of impacts in coastal and Puget Sound basins. As the Pacific Northwest

developed, there was a steady loss of stream habitat for anadromous fish and stream water quality was degraded in many areas. Agriculture, forestry, mining, railroads, roads, towns, and cities have all taken their toll on our native fish stocks.

Roads and railroads in the Northwest generally follow streams or flood plains. Many of them are located in the riparian zone (trees, brush, and grasses that grow alongside streams and benefit from greater soil moisture) of streams. These roads and railroads have directly reduced stream habitat and influenced stream hydraulics so that the salmonid habitat has been simplified. Sediment loads to streams have been increased by storm-related landslides.

Land settlement in the Pacific Northwest began in the 1860s and increased rapidly through 1900. Almost 10 million acres of crops and 50 million acres of rangeland occur in the area today. Irrigated lands comprise about 4 millions acres. Irrigation with associated erosion of sediments and runoff of farm chemical and toxins is a serious problem. Gully erosion and drainageway bank failures are not uncommon. Agricultural rerun flows adversely affect stream water quality in all of our river basins. Water quality sampling identified problem areas, and agricultural lands predominated these areas. Parameters and pollutants of concern were temperature, dissolved oxygen, turbidity, dissolved gasses, pH, pesticides, and toxins.

Agricultural sediment runoff into streams is mostly associated with storms. Estimates of sediment runoff into streams from agriculture, in comparison to forestry, range from 2:1 for pasture lands in good condition, such as those in the Tillamook Bay basin rivers in Oregon. Agricultural soil losses are impossible to prevent. Typical losses range from 0.1 ton per acre per year for light pasture use to 16 tons per acre per year for typical crop rotation. Steepness and length of slope, plant protection, seasonal precipitation, soil type, and the actual uses of land (especially tillage methods and frequency) all affect soil erosion and runoff into streams.

Grazing significantly affects soil erosion and degrades native salmonid habitat. By 1900, overgrazing occurred in most Pacific Northwest valleys, and livestock were concentrated along streams. Quality of salmonid stream habitat quickly degraded. Past range practices degraded much riparian habitat, especially in range and forest lands east of the Cascade Mountains.

Major valley areas of western Oregon and Washington had been logged by 1900 and converted to farms. Private agricultural lands generally are in the flood plains and these generally were the most productive and complex salmonid habitats before European settlement. Beavers were partly responsible for the habitat diversity and productivity. Fur trappers quickly reduced beaver numbers and settlers converted the complex flood plains into agricultural lands. Trees were cut for lumber and firewood. Channels were straightened and armored for flood control. For example, about 75 percent of the complex original shorelines of the Willamette River in Oregon were lost to agricultural practices and to channelization for local flood control to protect agriculture. Similar losses occurred in Washington.

Chemicals are commonly used in agriculture and ratios of chemical use in agriculture and forestry have been recently estimated. Pesticide runoff ratios for agriculture and forestry in

Oregon were estimated for this study and were found to be about 5,000 to 1. In Washington the ratio was about 2000 to 1, in favor of forestry.

Forestry is the most studied land use in terms of impacts on anadromous salmonids, and impacts have occurred. Early logging and lumber production were associated with waterways because of transportation constraints. Streams of increasingly smaller size were used to transport logs and lumber. Streams were cleared of obstructions and side channels and wetlands were blocked off to consolidate flow. Productive off-channel salmonid habitat was significantly reduced. Splash dams were common in western Oregon and Washington and operated into the 1950s on some streams.

Stream cleanup of log jams and debris has occurred for over 100 years in the Pacific Northwest. Fishery agencies encouraged and conducted debris cleanup from the 1940s into the 1970s. Apparently the destructiveness of the 1964-1965 floods caused the land management agencies to formally join forces with the fish agencies to vigorously remove woody debris from streams. The result was the well-intentioned removal of large debris from many miles of streams, and the subsequent loss of stream habitat complexity and productivity.

Riparian areas along streams were harvested first because of ease of access, good timer stands, and the historic use of streams to transport log. Skid trails, roads, and railroads were constructed in the riparian zone. Riparian and stream damage did occur in the post. Logging roads and associated landslides were a major source of stream sediment, especially older roads. Unregulated timber harvest in the riparian zone continued up to 1972, when the 1971 Oregon Forest Practices Act, sponsored by the timber industry, came into effect. Forest practice rules began to protect streams and the riparian zone along streams. Practices for protection evolved periodically, in 1974, 1978, 1983, and 1986. Similar regulations evolved in Washington during the 1970s and 1980s.

In 1987, Oregon state statutes were significantly revised. A formal riparian management area (RMA) was administratively created for state Class I streams (having anadromous salmonid or other significant game fish). A 50 percent stream canopy rule was added to a 75 percent shade rule previously in effect. Trees could be cut in the RMA, but not in the actual riparian zone. For state Class II streams (all other than Class I), protection measures included a vegetation buffer zone for water quality protection, stream crossing and protection rules, and directional falling and yarding restrictions. In 1991, additional industry sponsored forest practices legislation was passed. Its intent was the further protection of streams and other natural resources. Nothing was deleted from the 1987 rules. Some Class II streams received additional interim protection and clearcuts were limited to 120 acres with restrictions to adjacent clearcuts. Reforestation requirements were strengthened. A review and improvement of stream protection measures and stream classification by the Board of Forestry is underway and will be completed by the end of 1992. Again, similar regulations occurred in Washington and the most recent rules were enacted in June of 1992.

Evolution of stream and riparian area protection in forestry continues both in Oregon and

Washington. On balance, significant protective measures are in place today in forestry, more so than for any other water-uses or land-use practices. Anadromous fisheries response is expected but will take years - perhaps decades - to become apparent.

Municipal and industrial growth has also affected anadromous fisheries. Most urban and industrial centers in the Pacific Northwest are located in Puget Sound in Washington, in the Willamette Valley in Oregon, and along coastal bays and the Columbia River in both states. Pollution and consumptive water diversions have parallelled population growth. Although all major municipal and industrial dischargers meet present technology-based pollution control technologies, many river reaches still do not support designated beneficial uses. Toxics are a priority concern, and 30 to 50 water bodies in the region have serious toxics problems. Juvenile salmonids subject to chronic pollution stress are weakened and fall victim to predators and disease. They disappear. This is the effect of water pollution -- subtle, unseen, insidious losses.

Municipal and industrial developments have removed flood plain and estuary habitat. About 10 percent of estuary losses in Oregon were caused by filling wetlands to create municipal and industrial lands. In total, estuary loss in the Columbia River is about 40 percent, in Puget Sound about 70 percent, and along coastal Oregon and Washington about 25 to 40 percent each.

One can blame the massive Columbia-Snake River flood control projects and, to a large extent, the Willamette River flood control projects, on the cities of Portland, Oregon, and Vancouver, Washington. They are the primary beneficiaries of the flood control projects.

Natural Phenomena

Finally, natural phenomena have affected native salmonids. Floods such as those in 1964-1965 greatly affected salmonid habitat in western Oregon and Washington. Agriculture and forestry land uses aggravated these impacts.

Ocean biological productivity is affected by climatic events. El Nino events brought warmer surface waters and wind, as well as current reversals to nearshore ocean waters in Oregon and Washington. Upwelling of nutrient-rich deeper waters was depressed. Correlations between strong upwelling and good coho salmon growth and survival have been noted. This was dramatic up to the mid-1970s in association with increased hatchery productions. Catch surpassed historic records. Subsequently catches of coho salmon declined in the ocean as conditions changed with the developments of the 1982-1983 El Nino. Ocean nursery conditions have apparently been limiting coho salmon growth and survival since 1976 in the ocean nursery area off Oregon, and appear to have also affected Klamath River fall chinook salmon in the OPI area.

Predation pressures on salmonids have changed in recent decades in response to marine mammal protection and to human induced changes in freshwater environmental conditions. The northern squawfish is the primary freshwater predator of juvenile salmonids, and reduced river flows and warmer temperatures are more optimal for squawfish than for salmonids. Smallmouth bass, channel catfish, and walleye are also important juvenile salmonid predators in the Columbia

River. Perhaps 14 percent of all migrating juvenile salmonids in the John Day Pool of the Columbia River are eaten by fish predators.

Seals and sea lions have been protected by the Marine Mammal Protection Act since 1972. Harbor seal and California sea lion populations in Pacific Northwest marine waters have steadily increased between 4 and 12 percent per year. Based on population estimates and gut and scat analysis, seals and sea lions in Oregon and Washington waters may have consumed a combined 8 million pounds of salmon (about 1 million fish) in 1990. This was equivalent to about 17 percent of the two state's combined commercial salmon catch of 5.6 million fish in that year. Seals and sea lions also injure fish. Recent studies estimated that almost 20 percent of salmon ascending Columbia River dams had "seal bites". Such wounded fish are more vulnerable to disease infection and death and this might help explain part of the 50 percent indirect mortality of upstream adult migrants not accounted for by direct structural losses at Columbia-Snake River dams.

Significant flood plain riverine habitat and estuary habitat has been lost in Oregon and Washington. Because of these habitat losses, food chain production in the Columbia Estuary has shifted from a macrodetritus base, primarily derived from marsh and swamp vegetation, to a microdetritus base derived from phytoplankton. Similar changes have probably occurred in other coastal rivers and bays. Amphipods and isopods (invertebrates) are detrital feeders and important prey for juvenile salmonids. Significant production of these invertebrates has been lost because of the change in the food base. Insect production from marshes and swamps has been reduced proportionate to area losses. Insects are also important prey for juvenile salmonids. There is a strong implication that food supply may now be limiting in the Pacific Northwest in the area of river mouths and coastal bays. This is probably aggravated by large releases of hatchery fish. In 1990, hatchery releases in the Columbia River system were about 203 million juveniles and natural production was about 145 million juveniles. The 348 million juveniles are about 30 percent more than estimated historical production.

Seals and sea lions are significant potential competitors as well as predators of salmonids in marine waters. Estimated annual consumption of Pacific herring in Oregon and Washington waters by seals and sea lions is almost 35 million pounds. If these herring had been consumed by salmon they could have produced almost 4 million pounds of salmon flesh. The increase in seals and sea lions in nearshore waters could be a significant competitive interaction in years of poor biological production, such as the early 1980s and 1990s.

Another potential competitor for food for juvenile salmonids is the American shad. The Columbia River adult shad population has increased to 4 million in 1990 and billions of juvenile shad could be produced annually. Shad feed on zooplankton and insect larvae, and dietary overlap with juvenile salmonids in the Columbia River is significant. There is inference for food competition between shad and juvenile salmonids in the Columbia Estuary.

RECOMMENDATIONS

1. MANAGEMENT
   - o Manage salmonid populations to meet numeric biological spawning escapement goals.
   - o Restrict mixed-stock fisheries
   - o Create more terminal fisheries.
   - o Reprogram hatchery production to be more complementary to wild-spawning populations.
   - o Manage freshwater predator populations.
   - o Manage American shad in the Columbia River.
   - o Institute marine mammal (seal and sea lion) management.

2. HYDROPOWER AND FLOOD CONTROL
   - o Improve technologies to minimize operational impacts of hydroelectric operations.
   - o Purchase lower Columbia River coastal former flood plain and estuary lands.
   - o Restore lost river and estuary habitats.

3. AGRICULTURE
   - o Institute management regulations with stream and riparian protection rules.
   - o Achieve fish-screening protection at water diversions.
   - o Encourage irrigation water conservation and work to increase in-stream water for salmonids.

4. FORESTRY
   - o Improve stream protection measures, including large woody debris and temperature.
   - o Encourage salmonid habitat restoration.
   - o Manage riparian zone cattle grazing, especially in central and eastern Oregon.

5. MUNICIPAL-INDUSTRIAL
   - o Manage stream-based water quality including waste load allocations for both point and non-point sources.
   - o Give toxic control more priority.
   - o Encourage water conservation for industries and municipalities.

6. MINING
   - o Restrict aggregate extraction from all anadromous salmonid streams.

7. DREDGE, FILL, AND FLOOD CONTROL
   - o Prevent further estuary habitat losses.
   - o Prevent further flood plain reach riverine habitat losses.

Mr. VENTO. Yes. They will be put in the committee record or in the file. We will have some of the longer documents; and then if we choose to reprint, we won't have to reprint the documents.

I will not be able to return, but Congressman DeFazio has agreed to come back at about 2:00 p.m., I think it will be, to hear the last panel. That's the best I can do. I regret that we cannot pay more attention to questions, but I may submit written questions to the panelists that are here.

We have to go vote now. Thank you for your work in these areas, gentlemen.

[Whereupon, at 1:14 p.m., the subcommittee recessed, to reconvene at 2:00 p.m., the same day.]

PANEL CONSISTING OF THOMAS J. CASSIDY, GENERAL COUNSEL, AMERICAN RIVERS, WASHINGTON, DC; THANE TIENSEN, SALMON FOR ALL, PORTLAND OR; RAY J. WHITE, PH.D., WASHINGTON CHAPTER, TROUT UNLIMITED, EDMONDS, WA; AND GEORGE ICE, PH.D., FOREST HYDROLOGIST, NATIONAL COUNCIL OF THE PAPER INDUSTRY FOR AIR AND STREAM IMPROVEMENT, PHILOMOUTH, OR

STATEMENT OF THOMAS J. CASSIDY

Mr. DEFAZIO [presiding]. Just go in the order that we have.

Again, although I haven't yet had an opportunity to read your testimony, I will read it. So I would ask you to summarize the most cogent points within a five-minute maximum.

Mr. Cassidy.

Mr. CASSIDY. Thank you, Mr. Chairman.

American Rivers has been intensively involved in the land management planning efforts of both the Forest Service and the Bureau of Land Management since 1986. Our efforts have focused on the planning for scenic and wild rivers.

However, in the response to the precipitous decline of aquatic ecosystems in the Northwest and across the Nation, we have expanded our mission to include programs to ensure the health of aquatic ecosystems.

Earlier in the hearing Mr. Vento and Mr. Dicks addressed the decline of the salmon and the Columbia Basin alone, and the Northwest, generally addressing that even though the salmon runs are disappearing at alarming rates, they support 60,000 jobs and net the regional economy as much as $1 billion annually.

I think that the hearing we are participating in today is very significant because we have representatives of the land management agencies addressing the critical need of restoring salmon habitats across the Federal lands in the Northwest. It is certainly our view that the Clinton administration and the Congress must assert leadership and develop a set of coordinated strategies that will address and correct the causes of the salmon's slide into extinction.

There has to be a national recognition of the importance of preserving salmon and the regional economies that depend upon them. The management of salmon habitat on Federal lands is one critical issue.

I would just refer to part of my written testimony, which is the management of the Federal dams and federally licensed dams

throughout the Northwest, and an essential problem of the decline of salmon that needs to be addressed if we are to have a regional solution to this major natural resource problem.

We have at American Rivers recently completed a comprehensive compilation of existing planning direction for management of anadromous fish habitat in Forest Service and Bureau of Land Management plans throughout the Northwest, California, and Alaska. This project was undertaken with the cooperation and support of the Forest Service and BLM, and is a reflection of the desire of the agencies to identify where their plans are and how they can be improved.

I think certainly we are lucky in this room now to have some of the finest stream scientists in the Nation, many of whom work for the Federal agencies.

Our study has led us to a number of findings, conclusions and recommendations that we would briefly like to share with the subcommittee.

First, the plans neither with the Forest Service nor BLM, adequately address the cumulative effects of land management practices on fisheries and other aquatic resources. The plans do not describe fish habitat in quantitative terms, nor is there a relationship between the existing and the historic habitat conditions described in a very meaningful manner. It makes it very difficult for land managers to predict the response of aquatic ecosystems to land management practices.

The enormous scientific consensus that land management plans must identify the relationship between land management activities and cumulative effects on a watershed basin has not yet been incorporated into the plans promulgated by the land management agencies.

Second, the plans provide only the most general objectives for fish habitat conditions. We have recommended that the plans identify the desired physical, biological, and chemical conditions in the streams themselves and riparian areas that are necessary to meet habitat objectives that are required for the salmonid throughout the Northwest.

A real problem that has been touched on earlier has been the fact that the plans have not yet been amended to reflect the threatened, endangered and sensitive status of many salmonid species. The Columbia Basin Program Implementation Guide, the PIG which was announced with fanfare two years ago, set forth a number of agency actions that should be undertaken to protect salmon. That simply has not been implemented.

I think that the fisheries program staff is working on that. But still two years later we have yet to see actual on-the-ground implementation in any kind of binding way of these recommendations.

Certainly related to that would be the grazing allotment problem, which the Chairman observed earlier this morning.

I think another problem that really needs to be addressed on a regional basis is consistency in plans. Plans that are adjacent in geographical locations have very differing standards for the management of species in riparian areas, and if there is to be a coordinated effort, there should be greater consistency in agency planning.

Mr. DEFAZIO. If you could briefly summarize, that is a little more than five minutes.

Mr. CASSIDY. Probably the most important thing is accountability. Accountability, whether it be in revising grazing allotments, but accountability also in ensuring the enforceability of land management practice standards designed to protect salmon.

It is my opinion that after several years of working with the agencies, that we will only really achieve full protection of salmon when district rangers and forest supervisors are held as accountable to protect salmon habitat and to restore salmon habitat as they are to meeting timber targets.

[Prepared statement of Mr. Cassidy follows:]

TESTIMONY OF THOMAS J. CASSIDY, JR.

GENERAL COUNSEL

AMERICAN RIVERS, INC.

FOR OVERSIGHT HEARING

ON FOREST SERVICE AND BLM MANAGEMENT

OF SALMON HABITAT ON FEDERAL LANDS

Before:

THE SUBCOMMITTEE ON NATIONAL PARKS,

FORESTS AND PUBLIC LANDS

OF THE

HOUSE NATURAL RESOURCES COMMITTEE

March 11, 1993

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Mr. Chairman, members of the Subcommittee, thank you for the opportunity to testify today. My name is Thomas Cassidy and I am the General Counsel and Director of Federal Lands Programs for American Rivers. American Rivers is a 20,000 member organization committed to the protect and restore of the nation's outstanding rivers.

American Rivers has been intensively involved in the land management planning efforts of the Forest Service and Bureau of Land Management since 1986. Our efforts have primarily focused on the planning for potential wild and scenic rivers. However, in response to the precipitous decline of aquatic ecosystems in the Northwest and across the nation, American Rivers has expanded our mission to include programs designed to ensure the health of aquatic ecosystems.

In the Columbia/Snake basin alone, historic runs of 16 million adult salmon now number fewer than 2 million, only a few hundred thousand of which are wild. Over 200 native salmon stocks in the Columbia basin are already extinct. More than 200 other native stocks are at risk of extinction. Salmon and steelhead are an essential part of the life, culture and economy of the Northwest. Even though salmon runs are disappearing at alarming rates, they still support as many as 60,000 jobs and net the regional economy as much as $1 billion annually. Sustainable

salmon populations are also fundamental to fulfilling the federal government's treaty commitments to Tribal governments.

The Clinton Administration, and the Congress, must develop a set of coordinated strategies to address and correct the causes of the salmon's slide into extinction. The Subcommittee is addressing today one critical issue: the management of salmon habitat on federal lands. However, another essential issue that must not be overlooked in this debate is the management of federal dams and federally licensed dams throughout the Northwest. The most visible example is the system of federal dams on the Columbia / Snake River system. While there is still habitat available to salmon in Idaho, more than 90% of Idaho's salmon are killed by federal dams on the Columbia / Snake. Salmon survival on rivers such as the Rogue, Illinois and Yakima is also threatened by excessive water withdrawals and inadequate flows from federal dams.

American Rivers has recently completed a comprehensive compilation of the existing planning direction for management of anadromous fish habitat in Forest Service and Bureau of Land Management land management plans throughout the Northwest, Northern California, and Alaska. This project was undertaken in cooperation and with the support of the Forest Service and Bureau of Land Management.

This project evaluated the consistency of individual management plans with planning criteria specified by the Forest Service and BLM. The criteria were based upon existing agency policy and program guidance.

Our study has led us to a number of findings, conclusions and recommendations that we would like to share with the Subcommittee.

First, the Forest Service and BLM land management plans do not adequately address the cumulative effects of land management practices on fisheries and other aquatic resources. Agency management plans do not describe existing fish habitat in quantitative terms, nor is the relationship between existing and historic habitat conditions described in a meaningful manner. The result is that managers are unable to predict the response of aquatic ecosystems to land management practices, including timber harvest and road construction.

There is an increasing scientific consensus that land management plans should identify the relationship between land management activities and cumulative effects on watershed conditions and fish habitat. This must be done by stressing quantitative evaluations of the effects of land management activities on aquatic habitats. Existing plans rarely achieve this objective and only rarely include quantitative standards

that address comprehensively watershed conditions, including riparian habitats and water quality values.

We recommend that the agencies ensure that each land management plan include a quantitative and qualitative analysis of past, present and predicted resource use and condition on a watershed basis. Such a comprehensive watershed evaluation must be the basis of developing measurable objectives and quantitative management prescriptions.

Second, the plans provide only the most general objectives for fish habitat conditions. Few plans identify meaningful standards for anadromous fish as management indicator species or any standards for the conservation of aquatic and biological biodiversity.

We recommend that fisheries standards not merely describe "how" to manage fisheries habitats, but they should also identify the desired physical, biological and chemical conditions that are necessary to meet habitat objectives. This should also include water quantity and instream flow assessments. Fisheries objectives must be measurable over time and relate directly to forest goals, objectives and management plans.

Third, a very immediate problem is that resource management objectives set forth in the plans have not been amended to

reflect the status of threatened, endangered and sensitive salmonid species. The most glaring example of agency inaction in this regard is the continuing failure of the Forest Service to address its commitment to implement the Columbia Basin Program Implementation Guide ("PIG"). The PIG was announced with much fanfare in January, 1991, a time when petitions to list Pacific salmon under the Endangered Species Act were emerging as a significant regional and national issue.

The PIG has management objectives that describe physical, biological, and chemical characteristics necessary to protect and restore salmonid habitats throughout the Columbia basin. But the PIG has not been formally adopted as binding direction upon Forest Service activities; it remains merely advisory. Implementation of the Columbia Basin PIG, or a further refinement of it, would address immediate deficiencies and buy time for the implementation of a long-term comprehensive strategy.

Fourth, the decentralized character of Forest Service and BLM planning has resulted in a confusion of planning direction and criteria that are inconsistent from Forest to Forest and/or Resource Area and makes uniform planning direction difficult if not impossible. The inconsistency extends to Forests that are adjacent and even which manage fish habitat in the same drainage. Although plans acknowledge the importance of coordinating forest planning with other related federal, state and Tribal planning

efforts, there is very little, if any, effort to integrate management strategies with other agencies in the watershed.

We recommend that federal land managers take the lead to develop standardized criteria to ensure coordination of fisheries management on federal, state and Tribal lands. In addition, management areas need to be established using ecological boundaries rather than the zoning map type boundaries that now predominate planning. For example, riparian management areas need to be ecologically based rather than merely represent an arbitrary line on a map. The typical 100 foot wide riparian management area is arbitrary and scientifically indefensible.

Fifth, and the importance of this cannot be understated, both the Forest Service and BLM must increase the accountability of their fisheries programs to the public. Monitoring of plan implementation must become an internally enforceable limitation upon management activities. Federal land managers must be as accountable for their actions to preserve and restore aquatic resources as they are in meeting timber targets.

In conclusion, the Forest Service and BLM must develop watershed based planning that fully protects salmon and other aquatic resources. Agencies need to shift from stream restoration strategies designed to mitigate poor management practices to programs of watershed restoration. In recent years,

agency officials have proclaimed their commitment to ecosystem management. Congress and the public should be wary of such rhetoric and demand that on the ground decisions actually be guided by a new philosophy of ecosystem management.

Thank you again for the opportunity to testify before the Subcommittee today and I would be glad to answer any questions.

Mr. DEFAZIO. Thank you very much.

STATEMENT OF THANE TIENSEN

Mr. TIENSEN. Thank you.

I am Thane Tiensen. I am Council for Salmon For All, voice of the Columbia River commercial fishing industry. And my remarks are principally confined to the impact that the tremendous decline in the Northwest has had on that industry and on the related sports fishing industry, and on the communities that depend on salmon for their economic vitality and diversity.

I was struck by the testimony of Mr. Palmisano in the last panel, who talked about the problem, in his perspective, being essentially one of overfishing and the failure to recognize the importance of fish caught and eaten by marine mammals. I guess the logical conclusion of that is that if we eliminate all fish that catch fish and eat them, we won't have a problem anymore. We won't have a person who cares anymore, it seems to me.

The coastal communities—some of which are in your district, Mr. DeFazio—we in the Pacific Northwest who depend on salmon, have been frustrated by the inability of our political institution to address salmon habitat problems. The Pacific Fisheries Management Council that regulates fisheries harvest can not do that. There is no regulatory authority over habitat, it doesn't even have any advisory authority over habitat, and that is true of other institutions as well. So recognizing the failure of our institutions, we are struck with the existing agency process.

And certainly the testimony you have heard this morning, the testimony that you presumably will hear in the future, and your own knowledge of the problem, tells you that we have got to address the problem with habitat on public lands.

I won't chronicle the abuses. But certainly it is common sense and conventional wisdom now that we have to have some kind of program that addresses the habitat degradation. And the best way to address that problem is through the BLM and through the Forest Service and other Federal public lands agencies that have the ability to institute further protective measures through road building, and creating riparian barriers in harvest of timber. And if we don't do that, we very simply will not have any salmon stocks left on the coast.

We are talking about this year, conservation groups calling for zero harvest. No fish whatsoever or coho this year in the Pacific Northwest to take care of those stocks. And apparently there is going to be a petition to list all Oregon coho in the Endangered Species Act. And regardless of whether that occurs, the fact of the matter is that fishing is going to go down. But even if there was no harvest, the fish would continue to go down.

I urge you and implore you through your congressional oversight responsibilities to put pressure on these agencies, particularly with the new administration. We would all like to believe with the quote, "new sheriff in town" that there would be changes in the institution.

We are going to see the budget requests made and actions taken that actually result in increased habitat protection and a return in salmon stocks. And if for no other reason than doing that with

salmon, the reason is that salmon translates into jobs. It translates into very real jobs, and it creates economic stability in the coastal communities that are still dependent on salmon; $50 million in economic activity that is related to salmon.

This isn't a proposal that would eliminate jobs. It is a win-win for everybody. And I am hoping that the committee would keep that in mind as it weighs its responsibilities.

Thank you.

Mr. DEFAZIO. Thank you for meeting the time line there.

[Prepared statement of Mr. Tienson follows:]

TESTIMONY BEFORE THE HOUSE SUBCOMMITTEE ON
NATIONAL PARKS AND PUBLIC LANDS

March 11, 1993 by Thane Tienson

My name is Thane Tienson. I am an attorney with the law firm of Copeland, Landye, Bennett and Wolf with offices in Portland, Oregon and Anchorage, Alaska. I am a native of Astoria, Oregon which is located at the mouth of the Columbia River. Astoria is the headquarters of the Columbia River commercial salmon fishing industry. I have represented the industry for almost 10 years through its trade organization, Salmon For All.

We have a salmon crisis in the Pacific Northwest. Over 200 stocks are at risk of becoming extinct and overall salmon production is estimated to be less than 25 percent of historic levels. The steep decline in the number of fish available for commercial and recreational harvest jeopardizes the industry's survival and devastates coastal economies.

The Pacific Northwest is a region in transition. Historically dependent upon its abundance of natural resources for its economic and spiritual well-being, the region is now engaged in a titanic struggle to balance needed economic diversity, population growth and development pressures with the desire to preserve our natural resources for the benefit of future generations and for the values we hold dear.

Despite all of the media attention given to the Northern spotted owl and to the old growth forests, for which it serves as a surrogate, it is the salmon that best symbolizes our struggle to preserve our distinct cultural heritage. For Northwesterners, the protection of naturally spawning salmon is a moral, social, cultural and economic imperative. No other creature has had such a profound impact on the history of an entire geographic region. Virtually every community along the Pacific Northwest coast can trace its history and economic vitality to this majestic fish.

The economic contribution of salmon to the Northwest remains substantial: Over 50,000 jobs and a billion dollars in annual economic activity are thought to be at stake. But these jobs and the communities that depend

upon them for their lifeblood are in peril. Long overdue Endangered Species Act (ESA) listings in the Sacramento and Columbia River basins have resulted in further restrictions on already minimal harvest allocations and further ESA petitions are expected to be filed shortly affecting all coastal salmon stocks. While over-fishing occurred in the early years of the industry, it has been the unrelenting destruction of salmon spawning habitat that has been the primary culprit in the decline of these runs.

The cause of habitat destruction varies from river basin to river basin. In the Sacramento River, the enormous water diversions associated with the irrigation agriculture industry of the Central Valley Project are to blame for the Endangered Species Act listing of the Sacramento winter run salmon and, just recently, the Delta smelt. Further north, in the Klamath River Basin, and along the Oregon and Washington coast, diminished numbers of returning salmon can be traced almost exclusively to mismanagement of public lands. On the west side of the Cascades, roadbuilding in national forests and the failure to provide riparian buffers during commercial harvest of timber has destroyed countless miles of prime spawning habitat. On the east side, cattle grazing in stream beds and unscreened irrigation diversions have wreaked similar havoc. In the Columbia River Basin, where all Snake River salmon stocks have now been listed under the Endangered Species Act, improved public land management also is essential to salmon recovery efforts together with modification of federally operated and licensed hydroelectric dams.

Regrettably, our existing political institutions are terribly ill-equipped to resolve politically charged and complex issues of natural resource management. The life cycle of the salmon, to its detriment, cuts across numerous jurisdictional boundaries -- local, state, federal and even international agencies and commissions all command some authority over the salmon's biological journey or the critical habitat upon which its survival depends. Still, it is federal agencies and their land management policies that hold the key to salmon recovery efforts.

The abuses associated with public land management in the Northwest are legion. While some reforms have been instituted and agencies now claim to recognize and understand the importance of fish and wildlife protection mandates, actual measures taken to curb abuses are minimal. This is particularly true of the Forest Service and Bureau of Land Management (BLM)

where the agencies are under tremendous pressure to conduct timber sales to restore the cut. For example, in the Columbia River basin, the area I know best, the Forest Service has reneged on express promises to the Northwest Power Planning Council to revise cattle grazing allotment management plans and has yet to assess the adequacy of its forest and resource management plans for protecting salmon habitat and rebuilding the runs. It has also failed to implement the most vital aspects of the Columbia Basin Fish Habitat Management Policy Implementation Guide (PIG) that it held out as being the cornerstone of its commitment to help rebuild salmon runs in the Northwest.

Indeed, with few exceptions, all federal agencies in the region have failed to establish specific objectives to protect salmon stocks, have failed to establish timelines for accomplishing what vague promises are made and failed to establish mechanisms for review or accountability to determine the success of their salmon recovery efforts. The Forest Service, regionwide, continues to emphasize structural mitigations for degraded or destroyed salmon habitat at the expense of more effective preventive measures or restoration of degraded habitat as proposed by the Pacific Rivers Council.

Agency budget requests for salmon protection measures are often not made despite commitments made to the contrary. The President's FY 1993 budget for the Forest Service, BLM, Bureau of Reclamation, NMFS, F&WS and Corps of Engineers all included zero funding requests for important components of the regional salmon strategy adopted by the Power Planning Council and agreed to by these same agencies. I am confident that practice was repeated elsewhere in the region.

With the call to reduce the federal deficit through reduced federal spending, some funding requests will clearly need to be cut -- but hopefully not for environmental protection measures that will create jobs, not eliminate them. Increased numbers of returning salmon means increased numbers of jobs and increased wealth and economic stability for coastal communities, virtually all of which are timber-dependent too.

Contrarily, if we fail to take needed action, there is a corresponding cost as well. It is the cost of unemployment, food stamps and welfare and all of the accompanying social pathologies. That price is often hidden from the

taxpaying public and too often ignored because it is indirect. But it is very real, very expensive and very tragic. It is also avoidable.

The commercial salmon fishing industry has never been politically powerful or well organized. Salmon-dependent communities are often small in population and removed from larger population centers. But there is no reason the commercial salmon fishing industry cannot continue to contribute significantly to the economic vitality of the Northwest region and continue to provide an important and healthy food source for millions of American citizens and their families. If we continue to ignore the importance of responsible stewardship of our public lands, one of our most valuable and cherished natural resources will soon disappear. Biologists are unanimous in recognizing the importance of naturally spawning salmon to the health of the resource. The genetic diversity upon which salmon survival depends is, in turn, dependent upon the preservation and restoration of diverse spawning habitat on public lands.

Those lands can continue to be managed for multiple use. Those lands can continue to provide substantial economic benefits to core industries. But our public lands must also provide adequate protection of salmon spawning habitat.

The salmon crisis in the Northwest occurred primarily because public land management is out of balance and has been for too long. The time to redress that imbalance is now. Congressional oversight of public land management is an enormous responsibility. To discharge that responsibility fairly, prudently and zealously requires great political will and courage. It requires saying "No" to powerful special interests and inflicting some additional pain on an already depressed timber industry. But the salmon fishing industry will also continue to pay a huge price during the transitional process. These changes and the dividends they bring cannot occur overnight. If the cost of this investment seems high to some, however, I submit the payoffs are far greater:

- Predictability in industries that have experienced only chaos;

- Sustainable harvest levels to ensure long-term economic viability for industry and resource dependent communities;

- Restoration of balance and fairness in public land management;

- Avoidance of further ESA listings and the accompanying political polarization and protracted court fights that are both expensive and demoralizing; and

- An elevated quality of life for both present and future generations of Northwest residents.

The challenge presented to this committee is clear. The salmon, salmon-dependent communities and the salmon fishing industry, both sport and commercial, have only one hope: That this committee and the Congress will display the political leadership that is required to restore integrity and a sense of stewardship to the management of our public lands.

STATEMENT OF DR. RAY J. WHITE

Dr. WHITE. I am an independent stream habitat consultant from Edmonds, Washington. I have 35 years experience in analyzing and restoring stream habitats, so what we are talking about, I have long association with. Including, among other things, service as a State fishery biologist in Wisconsin, and most recently teaching at Montana State University where I retired a couple of years ago. And I have had very close participation with the Forest Service and BLM scientists and managers.

I have long served on Trout Unlimited's Board of Scientific Advisors and I appear today on behalf of that conservation organization.

I strongly support the initiatives of the Forest Service and BLM for better salmonid habitat. There is great potential, as we are hearing today, for positive changes in these agencies so that public forests and grasslands can better help save the Pacific salmon resource from demise.

The Forest Service and BLM have developed excellent knowledge about aquatic resources on their methods to protect and restore waters. This has been through the work of scientists like Drs. Sedell, Swanson and Mr. Williams, who I believe is in the room, and many other people in the Forest Service and BLM.

You can have tremendous faith in those professionals. They are some of the world's foremost stream scientists and managers.

What needs to be done is to free them from certain agency traditions and fund them to do what they know must be done. In particular, I support the watershed approaches like those in the Pacific River Council's proposal and in earlier efforts to forge ecosystem-wide management, such as the so-called "Gang of Four" report.

I would like to speak to certain attributes of the watershed strategy; it is important because it addresses habitat. That is the basis of the fishery. It is important because it is based on science, rather than whim. And it is important because it puts top priority on keeping the good habitat we have left, places second the priority, also very important, on restoring damaged habitat. So I urge you to put this watershed approach into effect on Federal lands in the Northwest.

Why? Because as we've just heard, our Pacific salmon are really in bad trouble. Also because past efforts to solve habitat problems for them has been inadequate and because the salmon need such major coordinated help now.

That is important to recognize and for us not to beat around the bush. It is things people do that have driven the resource to its knees. Washington's, Oregon's, Idaho's, and California's wild salmon populations are pitiful, fast-declining remnants of what they once were. And as Mr. Tiensen has just mentioned, there is the stopping of fishing on some stocks. So a national treasure is collapsing. It is the same mistake we made with the Atlantic salmon on the East Coast, and more recently with Great Lakes fisheries and many other magnificent fisheries in the United States.

The question is are we going to complete the mistake on the West Coast. The stocking of millions of hatchery salmon per year has failed to stem the decline. It has harmed wild populations and

it has harmed habitat by making people think that they didn't have to protect the habitat.

To avoid completing the disaster then it is essential to protect the remaining old-growth forest and better protect the grazing of grasslands. The massive living and dead wood in old-growth forests and riparian parts of the grasslands makes streams the proper place for salmon.

We need to look ahead to healing damaged watersheds and streams. Healing means putting nature in the position to do most of the restorative work herself by reducing human activities that cause the harm. That is tough to do.

It also involves replacing the huge logs in streambeds that were cleaned of them by old-time logging guides or misguided agency logjam removals recently. Correcting the abuse of Federal lands will go a long way toward ensuring survival of salmon stocks, but we must ultimately address the abuse from non–Federal lands, too.

To do this, Congress should take a hard look at the Clean Water Act. One of that act's objectives is to restore and maintain the biological integrity of all waters of the United States.

As Congress reauthorizes the Clean Water Act, I ask you to consider strengthening the nonpoint source provisions and keep in mind that the quality of our waters is more than just clean water. It is the structure and some other aspects, too, and the amount of water flowing in the stream.

So in looking hard at the Clean Water Act, it should probably mean that we could achieve, on a comprehensive basis, some of the same objectives that are under consideration here today.

Thank you very much.

Mr. DEFAZIO. Thank you.

[Prepared statement of Dr. White follows:]

TROUT UNLIMITED

Testimony of Trout Unlimited

before the

U.S. House of Representatives
Natural Resources Committee

Subcommittee on National Parks, Forests, and Public Lands

at a Hearing on
the Bureau of Land Management and Forest Service
Land Management Practices
and Their Effects on Watersheds and Fish

Prepared by
Ray J. White, Science Advisor

March 11, 1993

My name is Ray J. White. I am an independent stream habitat consultant in Edmonds, Washington, near Seattle. I am retired from Montana State University but remain on its adjunct faculty. My experience in assessing and restoring salmonid habitat covers 35 years, as a biologist in charge of evaluating Wisconsin's stream habitat management, as a visiting scientist in Europe, as a professor at two universities, and in consulting on many streams. I serve on Trout Unlimited's volunteer Board of Scientific Advisors and appear today on behalf of that organization and its 70,000 members nationwide. I also work with other fishery and conservation groups in the Pacific Northwest, and sit on the executive committee of a coalition of 35 organizations working to salvage the dwindling salmon resource. From close professional association with USFS and BLM scientists and managers, I have some understanding of their missions and of

problems and opportunities confronting them--and a great interest in today's subject.

I strongly support the initiatives in the U.S. Forest Service and Bureau of Land Management for better salmonid habitat, and for greater emphasis on watershed integrity. The potential is great for positive change so that our public forests and grasslands can do more to help prevent the demise of the wild Pacific salmon resource--and help it on the road to recovery. In particular, I support the watershed approaches like those embodied in the Pacific Rivers Council's proposal and in earlier efforts to forge ecosystem-wide management systems like the so-called "Gang of Four" report on late successional forest ecosystems.

As a scientist, I can speak to certain attributes of the watershed approach under consideration here today. It is based on science, it is geographically comprehensive, and it distinguishes between protecting present good habitat and restoring abused habitat. It emphasizes that, first and foremost, we should hang onto the good habitat that's left: our healthy watersheds. And it provides the basis for, as a second priority, restoring the various kinds of damaged habitat. I urge you to put it into effect on federal lands in the Northwest.

Why? Because our Pacific salmon are in bad trouble, because

past efforts to solve habitat problems have been inadequate, and because the salmon need major, coordinated help now.

Things people do have driven the resource to its knees. Washington's, Oregon's, Idaho's, and California's wild salmon populations are pitiful, fast-declining remnants of what they once were. In the last two years, fishing has had to be virtually stopped on many stocks. If we keep doing what we've been doing to our lands, forests and waters, there will soon be no economically viable wild salmon fishery.

Please realize that a national treasure is collapsing. It is collapsing because of us--because of what we are doing. We can still turn the situation around if we change some of our actions, but it will have to be soon.

Again and again in our history, we have destroyed the habitat basis of fisheries and thought that hatchery programs (a sort of fish farming) could make up for it. That hasn't worked. It has never worked. For fundamental biological and economic reasons, it cannot work. Only healthy watershed ecosystems can economically produce salmon on a sustained basis.

In the Pacific Northwest are we going to echo past folly? Will we continue to damage our forest and grassland watersheds and lose the fisheries that depend on them?

In our squandering of one major American fishery resource after another, destruction of virgin forests has played a major role. Beginning over 250 years ago, people cleared the East Coast forests. Together with overfishing, river damming, and pollution, this eradicated our Atlantic salmon by about the year 1900. Massive artificial breeding and stocking in the late 1800s failed to save that magnificent fishery, and recent high-tech hatchery programs on somewhat rehabilitated streams have failed to recreate a significant Atlantic salmon fishery.

We took the Midwest's timber, otherwise abused streams and lakes there, and devastated that region's fisheries. The once-thriving Michigan grayling dwindled as logging pushed across that state, and, by 1932, it vanished. The native Great Lakes fish community, much of which spawned in pre-logging streams, largely disappeared by 1945 or 1950. In it's place is a grotesque assortment of exotics--fishes that don't belong and don't function properly there. They don't behave themselves, so to speak. Now we have to put up with them and make the best of it.

The virtual extirpation of beaver, followed by overgrazing, environmentally abusive hard-rock mining practices, excessive logging, and irrigation diversion, radically changed watersheds and streams in the interior West, annihilating many stocks of cutthroat trout, that region's primary native salmonid. Hatchery programs made the situation worse by genetic disruption and by

introducing competitor species.

If we don't act fast and intelligently in the Pacific Northwest, we will soon complete a colossal repetition of those mistakes. Over 100 locally adapted Pacific anadromous salmon and trout stocks are already extinct: over 200 are at risk[1] of extinction. Only a fast-dwindling vestige of the world's once most spectacular salmon resource remains. And, as you know, several Pacific salmon stocks were recently listed as threatened and endangered, and petitions for listing many more stocks are imminent unless massive change is accomplished soon.

Annually stocking millions of hatchery salmon has failed to stem the decline; it also has damaged wild salmon populations and deluded people into ducking the hard decisions[2] [3] [4] [5] [6]. Among the hard decisions society has all too often avoided are to protect intact habitat and to restore abused habitat. If we make better choices now, the remnant wild stocks can begin to rebuild themselves.

An essential choice is to manage our federal lands differently. We have long tended to emphasize timber cutting and livestock grazing. After the Multiple-Use-Sustained-Yield Act of 1959, more effort toward non-commodity and indirect commodity uses of National Forests began. Still, these were too often token sidelines. It's easy to set policy, then work around it.

Where stream habitat work was done in the Pacific Northwest, it was at first often without scientific understanding; agencies sometimes did not realize how little they knew and proceeded on a so called "common sense" basis, doing more harm than good.

But much has been learned through trial, error, and research. USFS and BLM now have excellent knowledge and methods. What's needed is to eliminate traditional administrative obstacles and provide funding, so the agency stream scientists and managers can, in comprehensive, coordinated ways, do the job they know has to be done.

Let's look at some general areas of stream management capability that have improved over the years. In the past, some stream restoration methods that work wonders in Midwestern creeks were applied to steep West Coast streams and did not withstand high flows[7] [8], but now methods that are more durable and more in keeping with the Northwest's natural stream characteristics are used[9] [10] [11], and there is profound understanding of the needs and possibilities for ecological approaches in such work[12].

Also, until about 15 years ago common sense said wood debris jams in Pacific Northwest streams obstruct salmon runs, and major programs were undertaken to remove such material. But as Forest Service research revealed, salmon, having lived for millennia in streams choked with fallen wood, were well adapted to it; they

usually could get over or around the supposed obstacles, and wood debris accumulations (and beaver dams) proved to help produce salmon in many ways[13].

Old-growth forest sheds large logs and other woody debris into streams, tying their beds together, stabilizing them. The downed wood also traps gravel, forming spawning grounds, and provides complex cover and diverse pools, where fish hide, rest and feed[14] [15]. These effects are especially important on steep Northwest streams.

An unfavorable administrative tendency in the USFS and BLM has been toward quick economic yields and technologic fixes rather than toward ecologic health and long term productivity of lands and waters. It has been a ruin-and-rebuild approach, probably self-deceiving from the start, and often less than whole-hearted on the rebuilding end. Rather than managing conservatively for sustained natural functioning of forests and grasslands, on which such resources as salmon runs depend, there has been radical exploitation, giving high short-term profits to a narrow range of users and damaging fundamental land-water-vegetation functions, followed sometimes by so-called "mitigation." Whenever you hear "mitigation" in connection with stream habitat work, an alarm bell should go off in your mind, and you should examine for trouble.

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In trying to mitigatively "fix" stream habitat after destructive logging, roading and grazing, public land agencies have gotten into trouble--applying aspirin while continuing to do what causes the underlying cancer. Stream habitat certainly can be restored. In small, gently-flowing creeks of the East, of the Midwest, and of western mountain valleys, it is relatively easy and inexpensive. But on steep, high-force streams of the Pacific Northwest, doing it right requires substantial investment of resources, something which agencies have too seldom seen fit to spend.

This is not to say that stream habitat restoration should not be done in on the Pacific Northwest's streams. There has been huge damage, and our land management agencies and others should spend the funds needed for healing. And the basic approach should be more one of <u>healing</u> than fixing. The self-healing powers of Nature are tremendous. The main thing is to put Nature in position to exert that power.

To enable healing, the first step is to <u>remove the disease</u>. This means halting or reducing the human activities that are causing the damage. Once that is done, the actions of water, soil and vegetation in shaping stream channels often will do much to bring back productivity for salmon. It is a principle of salmonid stream habitat management that the greatest gains are achieved by alleviating human influences on the worst-abused

streams. But keep in mind, this is second in priority to protecting remaining undamaged habitat.

In other situations, putting Nature in position to self-heal salmon habitat means putting jams of huge logs in streams where such "obstructions" were once removed when the channels were used to float logs to market--and where second-growth forest has not had time to grow and topple enough big trees to restore proper channel structure. Hundreds of years may pass before a second-growth forest does this, even if left uncut.

I submit that it will be most rewarding in the long run NOT to road and cut the scarce remaining old-growth forest, but to manage more conservatively our present timber-harvest forests and grazing lands. Thus, needs for costly "mitigation" will be reduced while reaping sustained benefits, such as salmon runs AND timber AND beef AND wildlife AND recreation. Many of the methods for such management have been developed by aquatic ecologists and hydrologists within USFS and BLM. The agencies should be reformed to enable these people to put into practice what they have developed.

Organizing such reforms according to watersheds will be far more effective than according to the present administrative or political boundaries. A watershed is a logical unit in terms of water catchment and flow and of the plant and animal life

deriving therefrom. A watershed is an ecosystem encompassing a nested system of forest (or grassland) and aquatic ecosystems.

There is much call of late for "ecosystem" management. This makes eminent sense--managing for the function of the system, rather than managing parts of it piecemeal, without regard for other parts or the whole system. We do not yet know the forms that ecosystem management will take, but managing for ecological integrity (in a word, health) of watersheds will surely be a good start. The Pacific Rivers Council strategy for hanging onto the last best watersheds in the Pacific Northwest and for securing them by putting people to work stormproofing the human-affected edges of such watersheds would seem to be one helpful first step. It is in keeping with the new management thrusts that are developing within USFS and BLM, based on scientific understanding of interrelationships among land, water and organisms. I urge that in guiding USFS and BLM, Congress consider the proposal and the ideas presented here.

Correcting the abuse of federal lands will go a long way toward ensuring the survival of many of the salmon stocks that are today in great peril. Ultimately, however, we also must address the threats that derive from the abuse of the non-federal lands that lie within our Pacific Northwest watersheds. To do so, Congress will need to take a hard look at the Clean Water Act. One of the Clean Water Act's primary objectives is to

restore and maintain the biological integrity of all waters of the United States. As Congress reauthorizes the Clean Water Act, I ask you to consider strengthening the Act's "non-point source" provisions and creating a strong anti-degradation policy to protect all of our nation's outstanding national resource waters. Doing so will mean that we can achieve on a comprehensive basis the same objectives that are under consideration here today.

Thank you. I would be happy to answer any questions you might have.

Notes

1. Nehlsen, W., J. E. Williams, and J. A. Lichatowitch. 1991. Pacific salmon at the crossroads: stocks at risk from California, Oregon, Idaho, and Washington. Fisheries 16:4-21.

2. Goodman, M. L. Preserving the genetic diversity of salmonid stocks: a call for federal regulation of hatchery programs. Environmental Law: 20:111-166.

3. Hilborn, R. 1991. Hatcheries and the future of salmon in the Northwest. Fisheries 17:5-8.

4. Meffe, G. K. Techno-arrogance and halfway technologies: salmon hatcheries on the Pacific coast of North America. Conservation Biology 6:350-354.

5. White, R. J. 1992a. Why wild fish matter: a biologist's view. Trout (Trout Unlimited), Summer 1992:25-33,44-50.

6. White, R. J. 1992. Why wild fish matter: balancing ecological and aquacultural fishery management. Trout (Trout Unlimited), Autumn 1992:16-33,44-48.

7. Hamilton, J. B. 1989. Response of juvenile steelhead to instream deflectors in a high gradient stream. Pages 149-158 in R. E. Gresswell, B. A. Barton, and J. L. Kershner. Practical approaches to riparian resource management: an educational workshop. U.S. Bureau of Land Management, Billings, Montana.

8. Frissell, C. A., and R. K. Nawa. 1992. Incidence and causes of physical failure of artificial fish habitat structures in streams of western Oregon and Washington. North American Journal of Fisheries Management 12:182-197.

9. House, R., V. Crispin, and R. Monthey. 1989. Evaluation of stream rehabilitation projects--Salem District (1981-1988). Technical Note (T/N OR-6), U.S.D.I. Bureau of Land Management, Portland, Oregon.

10. House, R., and V. Crispin. 1990. Economic analysis of the value of large woody debris as salmonid habitat in coastal Oregon streams. Technical Note (T/N OR-7), U.S.D.I. Bureau of Land Management, Portland, Oregon.

11. House, R., V. Crispin, and J. M. Suther. 1991. Habitat and channel changes after rehabilitation of two coastal streams in Oregon. Pages 150-159 in J. Colt and R. J. White, editors. Fisheries bioengineering symposium. American Fisheries Society Symposium 10, Bethesda, Maryland.

12. Sedell, J. R., and R. L. Beschta. 1991. Bringing back the "bio" in bioengineering. Pages 160-175 in J. Colt and R. J. White, editors. Fisheries bioengineering symposium. American Fisheries Society Symposium 10, Bethesda, Maryland.

13. Dolloff, C. A. 1986. Effects of stream cleaning on juvenile coho salmon and Dolly Varden in southeast Alaska. Transactions of the American Fisheries Society 115:743-755.

14. Bisson, P. A. and eight others. 1987. Large woody debris in forested streams in the Pacific Northwest: past, present, and future. Pages 143-190 in E. Sale and T. Cundy, editors. Proceedings of a symposium on streamside management: forestry and fisheries interactions, University of Washington, February 12-14, 1986.

15. Sedell, J. R., P. A. Bisson, F. J. Swanson, and S. V. Gregory. 1988. What we know about large trees that fall into streams and rivers. Pages 47-81 in C. Maser, R. F. Tarrant, J. M. Trappe, and J. F. Franklin, editors. From the forest to the sea: as story of fallen trees. General Technical Report PNW-GTR-229. U.S. Department of Agriculture Forest Service, Portland, Oregon.

STATEMENT OF DR. GEORGE G. ICE

Mr. DEFAZIO. Dr. Ice.

Dr. ICE. Thank you.

My name is George Ice. I am a forest hydrologist with the National Council of the Paper Industry for Air and Stream Improvement and have a Ph.D. from Oregon State University and a Masters from the University of California at Berkeley. And I have some materials that I would like to enter along with, to support my statement.

I would like to discuss five key issues. Forest management practices have improved due to the use of Best Management Practices and the recognition of riparian areas. Watershed damage observed in recent years is tied to past practices and watershed abuses can and are being addressed.

There are some important principals that should be used in watershed analysis and identification of management needs. Forest management practices have dramatically improved practices by using riparian management techniques. Riparian management areas on national forests are now routinely used providing shade and providing for recruitment to streams of lost weed debris. Landslides are an important process of sediment delivery to streams. Seventy-six percent of the landslide volume came from 9 percent of the land area. Recognition of hazards can result in improved performance.

A study in British Columbia found that because of cautious road construction, landslides from roads were less frequent on steep areas than areas of moderate gradient. A recent study of landslides in the Deschutes Watershed in Washington, near Olympia, found that most of the landslides were from roads greater than 15 years old.

Recommendations for maintenance and corrective actions can be developed from those types of inventories. There is no shortage of management/enhancement techniques to address the problems. Many of these enhancement techniques need more research to determine their value and the proper conditions for their application.

Watersheds can recover from disturbances as a result of improved management practices and the inherent resiliency of watershed systems to the natural disturbances. The South Fork of the Salmon River in Idaho had documented improvements as a result of the forest management activities in the watershed.

A moratorium on management activities in the watershed restoration work, followed by a period of forest management under new guidelines, resulted in the cleaning out of vines in the pools, and reduced vines in the gravels.

Work by Andrus and Froehlich has shown that, particularly for narrow streams in productive coastal locations, any temperature increases resulting from the removal of riparian vegetation by fire or harvesting quickly recovers. A group of industry watershed experts has been working on watershed analysis to determine the health of watersheds and identify watershed management needs, and these guidelines are provided in some of the material that I am submitting.

Each watershed is unique. Watershed assessments need to recognize the important hydrologic and geomorphic processes in the wa-

tershed to achieve maximum management flexibility. A watershed assessment is not adequate if it cannot account for how, where and when an activity is conducted and the risk to beneficial stream uses.

I would like to say that I couldn't disagree more with the statement that Mr. Higgins made in supporting the Six Rivers National Forest application of the model assuming that private lands are completely clear-cut every year. I think that is a misapplication of flawed model and it is the type of application that makes it difficult to have cooperation between private lands and Federal lands.

I have worked on or visited numerous watersheds in the western United States over the past 20 years. I have worked in California where the road construction diverted streams. Those are being addressed during the current cutting cycle.

I have visited Grouse Creek in California where adler is recapturing soil deposits from landslides which occurred during the 1964 floods.

I have toured the Middle Santiam Basin in Oregon where intensive harvesting has resulted in little water quality change. I am participating in a project in Idaho where corduroy roads up streams, flumes, and splash dams were used to yard out trees in the 1930s, and today those effects are muted.

Because of improved operations and the use of Best Management Practices, conservative watershed management protection programs, stream and watershed restoration efforts and the natural recovery of systems, I conclude that forest watershed health is better today than it has been for 30 years and that it will continue to improve.

[Prepared statement of Dr. Ice follows:]

Technical Comments of

George G. Ice, PhD

Research Forest Hydrologist,
National Council of the Paper Industry
for Air and Stream Improvement

Before the

Natural Resources Subcommittee
on National Parks, Forests,
and Public Lands

of the

United States House of Representatives

March 11, 1993

I INTRODUCTION

Thank you for the opportunity to discuss watershed health in the Pacific Northwest. I am a forest hydrologist with the National Council of the Paper Industry for Air and Stream Improvement (NCASI). My responsibilities include the NCASI forest water quality program and work on the NCASI Cumulative Watershed Effects Program. The mission of the NCASI Forest Water Quality Program is to provide technical information and conduct research that creates forest management options for achieving water quality and stream quality objectives. Specific goals include:

(1) Develop or validate management practices that can reduce water and stream quality impacts from forest operations and maintain sustainable stream quality.

(2) Develop or validate assessment methods to facilitate adaptive management by the forest products industry.

(3) Develop or validate predictive methods which incorporate a landscape and temporal perspective in water and stream quality protection.

(4) Provide technology transfer of information to the industry on methods to reduce water and stream quality impacts.

(5) Provide the industry with technical review of proposed nonpoint source control strategies.

I would like to discuss five key issues related to forest watershed health on public lands in the Northwest.

(1) Declines in salmonids in forest areas are not tied solely to watershed conditions.

(2) Forest management practices have dramatically improved through the use of Best Management Practices, and recognition of sensitive watershed sites including riparian areas.

(3) Watershed damage observed in recent years is often tied to past practices. Watershed hazards created by past practices can and are being addressed.

(4) Watersheds are resilient and, often show improving conditions as a result of watershed protection and improved practices.

(5) There are some important principles which should be used in watershed analysis and identification of management needs.

II DECLINES IN SALMONIDS NOT SOLELY TIED TO WATERSHED HEALTH

Watershed health, tied to logging and forest roads, is often considered the primary cause of declines in salmonids in forested areas. However, there are a number of studies and anecdotal evidence that other factors are important.

A. South Fork of the Salmon

Research on the South Fork of the Salmon River documented significant damage to the watershed as a result of major storm events coupled with concentrated jammer logging operations. These short cable yarding systems required as much as 30 percent of the harvest area to be dedicated to roads. A rapid decline in salmon red counts was observed in the South Fork of the Salmon river between 1957 and 1966 at a time when sedimentation was occurring in the river. However, declines were also observed for salmon redds in the Middle Fork of the Salmon, which is in a Wilderness Area. Research by Megahan and McIntyre indicates that the watershed health related to forest management may have accelerated the salmon declines in the South Fork but that other factors, presumably downstream stresses, are contributing to the downward trend in both streams (1).

B. Bull Trout

Bull trout (Salvelinus confluentus) is being considered for listing as an endangered species. Contributing to declines in bull trout are habitat damage, dam building, over-harvest, hybridization with brook trout, and competition with non-native species. In Crater Lake National Park a precipitous drop in bull trout has been tied to the introduction of brook trout. In the Swan Valley in Montana, streams in managed forest areas are supporting healthy populations of bull trout (2).

III FOREST BMP'S AND MANAGEMENT ADDRESSING CRITICAL WATERSHED CONDITIONS

NCASI recently contracted with Dr. Dan Brinkley and Lee MacDonald of Colorado State University to assess the effectiveness of Best Management Practices in controlling non-point source pollution from silviculture. They concluded that:

"The quality of water draining from forest watersheds is generally the best in the nation. Forest practices, particularly road construction and harvesting, have the potential to degrade water and stream quality primarily through increased sediment and changes in channel conditions. Intensive research projects have generally found that implementation of BMPs can prevent substantial degradation of water quality" (3). They also recommended more research into cumulative watershed effects. In nearly all cases,

dilution, dispersion, and storage reduce the impacts of management activities downstream of the managed watersheds ... [but under some conditions] ...downstream effects may be more dramatic than on-site effects...

Forest management practices have dramatically improved water quality protection by using riparian management areas and by recognizing and protecting high hazard sites. Riparian areas on National forests, as well as state and private lands, are now managed to protect water quality and stream habitat conditions. This includes providing shade, avoiding disturbance by equipment, and some retention of trees for recruitment to the stream of large woody debris. Studies show that stream temperature increases are avoided and suspended sediment increases minimized by the use of riparian zones (4).

Watershed damage can also occur where high hazard sites are not recognized. Landslides are an important process in sediment delivery to streams and potential channel damage (5). An inventory in the Siskyou National Forest by Amaranthus et al. found that 76 percent of the landslide volume came from only 9 percent of the land area (6). Two studies show that recognition of hazards can result in improved performance. In the Waldport Ranger District, Barnett found that reduced road landsliding in recent years appears to be a result of "...improved road-building techniques, better enforcement of contract specifications, and a reduction in miles of roads built each year" (7). MacMillian Bloedel in British Columbia found that landslides from roads were actually less frequent in steep areas than areas of moderate gradient, probably due to more caution in road construction and design (8).

IV DAMAGE OFTEN ASSOCIATED WITH PAST PRACTICES

Observations of watershed damage are often associated with past practices rather than current practices. In California I visited a timber harvest plan in the Sierra Nevada where channel damage had resulted from channel diversions and skidding through the channel in the 1960's (prior to the implementation of the Forest Practices Act). This sites was eventually approved for harvesting with management measures to improve the stream conditions and reduce future sources of sediment resulting from the past activities (9).

A recent study of landslides in the Deschutes Watershed in Washington, near Olympia, found that most of the landslides experience during a 100+ year storm were from roads greater than 15-years old (10). "The majority of the problems occurred because of steep cutslopes and block culverts." Recommendations for maintenance and corrective actions can be developed from these types of inventories. In the Mapleton Ranger District of the Siuslaw National Forest, unstable sidecast material from roads creates a potential for landslides. This type of road construction would not be allowed today for these types of conditions. The

district staff have developed a sidecast pullback rating system to determine where high hazard conditions occur and to remove those hazards (11).

Where existing damage exists there is no shortage of management/enhancement techniques to address problems (12). These include such activities as tree planting in riparian areas, fencing of riparian areas (to exclude cattle), log and boulder placement in streams for increased spawning and rearing habitat, use of brush and tree bundles for stream cover, off-channel pool development, construction of instream gabions, use of tree tops for rip rap, construction of sediment traps following wildfires, blasting to develop pools in rock-bottom channels, removal of fish-passage barriers, and construction of fish ladders. Many of these enhancement techniques need much more research to determine their value and the proper conditions for their application. The recent history of woody debris clean-ups and log removals, once recommended and now condemned, suggest the need to be careful about "enhancement" approaches.

V WATERSHED HEALTH CAN RECOVER

Watersheds can recover from disturbances as a result of improved management practices, and the inherent resiliency of the watershed systems to natural disturbances.

A. South Fork of Salmon

The South Fork of Salmon River, described earlier, had documented increases in gravel fines and filling of pools, at least partly as a result of management activities in the watershed. A moratorium on management activities and watershed restoration work, followed by a period forest management under new guidelines, resulted in cleaning out of fines in pools and reduced fines in gravels (13).

B. Alsea Watershed Study

The Alsea Watershed in coastal Oregon was one of the first experiments on the use of buffers and stream management zones to protect water quality. As part of that study one small watershed was nearly completely clearcut to the stream and then burned. Stream temperature and sediment increased and dissolved oxygen decreased dramatically. Streamwater dissolved oxygen returned to near saturation when fine organic material was removed or flushed from the stream. Stream temperatures rapidly returned to normal following recovery of riparian vegetation (4). Work by Andrus and Froehlich has shown that, particularly for narrow stream in productive coastal locations, any temperature increases resulting from removal of riparian vegetation by fire or harvesting quickly recovers (14).

VI PRINCIPLES FOR WATERSHED HEALTH ASSESSMENTS AND MANAGEMENT

NCASI, through a group of industry watershed experts, has been working on a set of guidelines for watershed analysis to determine the health of watersheds and identify watershed management needs (15,16). These guidelines include:

(1) Identify the important hydrologic and geomorphic processes of concern.

(2) Describe the relationships between environmental damage and beneficial uses by evaluating the physical processes linking on-site disturbances to downstream effects.

(3) Provide a measure of the sensitivity of beneficial uses to management (thresholds will be included where appropriate).

(4) Describe effects of land management relative to background conditions and develop methods to assess recovery factors.

(5) Utilize methods that are understandable, reproducible and practical, and supported by available resource information.

(6) Provide evaluations of cumulative watershed effects that are based on measured physical or biological effects rather than indirect indicators of change, thus allowing assessment of accuracy in actively managed watersheds.

(7) Describe the uncertainty caused by technical knowledge gaps.

Watershed assessments needs to recognize the important processes of concern to achieve maximum management flexibility. A sediment budget contracted by the Forest Service in the Grouse Creek Watershed of California indicated that tractor yarded harvest units were creating 10x the sediment as cable yarded units. The "cumulative effects model" for this area was based on peak flow concerns related to soil compaction, but most experts felt sediment production was the major issue. By requiring cable yarding on steep terrains, harvest levels could be increased with less sediment delivery to the stream channel. By focusing on the important processes, management practices can be designed to protect or improve watershed health. A watershed assessment is not adequate if it can not account for how, where, and when an activities is conducted as well as how much activity is carried out or if it can not address the risks to beneficial stream uses.

VII SUMMARY

I have worked on or visited numerous watersheds in the Western United States over the past 20 years. I've worked on the Mokelumne River in California where poor road construction and yarding in the 1960's diverted streams. Those impacts have either stabilized naturally or are being addressed during the current cutting cycle.

I've visited Grouse Creek in California where alder is recapturing soil deposits from landslides which occurred during the 1964 floods. I've seen the remarkable watershed recovery in Needle Branch Basin in Oregon and the careful harvesting in the Bull Run Watershed near Portland, Oregon. I've toured the Middle Santiam where intensive harvesting has resulted in little water quality change. I'm cooperating on a project in the Mica Creek Watershed in Idaho where corduroy roads up streams, flumes, and splash dams were used to yard out trees in the 1930's and today those effects are muted. Because of improved operations and use of BMPs, conservative watershed management protection programs, stream and watershed restoration efforts, and the natural recovery of stream and watershed systems, I must conclude that forest watershed health is better today than it has been in 30 years and that it will continue to improve.

LITERATURE CITED

(1) Megahan, W.F., McIntyre, J., "Some Perspective on the Upriver-Downriver Issue in the Columbia Basin -- A Case Study from Idaho's Salmon River" In Material Presented at the West Coast Regional Meeting September 30, October 1, 1992, General Session, 156-157, NCASI Special Report 92-13 (November 1992).

(2) Thomas, G., "Status Report: Bull Trout in Montana", Prepared for the Montana Department of Fish, Wildlife, and Parks, Helena, MT (August 1992).

(3) Binkley, D., MacDonald, L., "Forests as Non-Point Sources of Pollution, and Effectiveness of Best Management Practices" NCASI Technical Bulletin (in press).

(4) Moring, J.R., "The Alsea Watershed Study: Effects of Logging on the Aquatic Resources of Three Headwater Streams in the Alsea River, Oregon - Part II - Changes in Environmental Conditions", Fisheries Rep. 9, Oregon State Dept. of Fish and Wildlife, Corvallis, OR (December 1975).

(5) "Catalog of Landslide Inventories for the Northwest" NCASI Technical Bulletin 456 (April 1985).

(6) Amaranthus, M., Rice, R., Barr, N. Ziemer, R.R., "Logging and Forest Roads Related to Increased Debris Slides in Southwest Oregon" Jour of Forestry 83(4)229-233 (April 1985).

(7) Barnett, D.D., "A Thirty-Year Inventory of Mass Wasting in the Waldport Ranger District of the Siuslaw National Forest," in Forest Management Practices and Natural Events - Their Relation to Landslides and Water Quality Protection, NCASI Tech. Bull. No. 401 (June 1983).

(8) Bourgeois, W.W., "Timber Harvesting Activities on Steep Vancouver Island Terrain, " in Forest Soils and Land Use, 393-409, Youngberg, C.T., [Ed.] Dept. of Forest and Wood Sci., Fort Collins, CO (August 1978).

(9) Dept. of Conservation, Division of Mines and Geology, "Engineering Geologic Review of Timber Harvesting Plan 4-91-128/ama-14 (September 22, 1992).

(10) Toth, S., "A Road Damage Inventory for the Upper Deschutes River Basin" A Final Report Submitted to the SHAMW Committee (January 1991).

(11) Young, B., Bush, G., Dipert, D., "Pullback of Nonhomogeneous Sidecast Material - A methodical Approach to Its Disposition", USDA For. Serv., Siuslaw National Forest, On File at Headquarters, Corvallis, OR.

(12) Ice, G.G., "Management/Enhancement Techniques: Getting the Job Done in Forestry", Paper Presented at Oregon's 1992 Watershed Enhancement Conference, Governor's Watershed Enhancement Board, Portland, OR (January 1992).

(13) Platts, W.S., Torquemada, R.J., McHenry, M.L., Graham, C.K., "Changes in Salmon Spawning and Rearing Habitat from Increased Delivery of Fine Sediment to the South Fork Salmon River, Idaho", in Trans. Am. Fish. Soc. 118: 274-284 (1989).

(14) "The New Alsea Watershed Study" NCASI Technical Bulletin 602 (February 1991).

(15) "Status of the NCASI Cumulative Watershed Effects Program and Methodology" NCASI Technical Bulletin 634 (June 1992).

(16) Ice, G.G., "TMDL, Watershed Analysis, Basin Planning and Cumulative Effects" Paper Presented for American Forest and Paper Nonpoint Source Work Group and Water Quality Committee Meeting, Washington, DC (February 1993).

Mr. DEFAZIO. Anyone who can stay, come up to the panel.

I will ask a couple of questions and then we will let you all go.

Let the record stand corrected on Dr. Ice's place of residence. I am sensitive to just living in Springfield versus Eugene, versus somebody saying that I live in Washington, D.C. They haven't done that to me yet.

A couple of questions that I will direct, and then—I wanted to follow up on something that Mr. Frissell said, which I didn't quite follow or understand fully, which was talking about the tremendous loss of smolts after leaving the spawning area, between the spawning area and the damming, and you didn't expand on that.

In the Columbia system you were talking about.

Dr. FRISSELL. Nobody quite understands what is going on. We know that there have been some recent studies where there have been detailed samplings of where the fish are disappearing in the system. Formerly we had data at the dam. Now we are able to close another gap in that life history and that is in the stream, the tributary portion of the base. And I know we are finding that lots and lots of fish are disappearing before they get to the spawning beds.

We don't know what is happening to them. They are simply disappearing, and since they are in freshwater habitat, it may be due to the quality of that habitat which is known to be severely degraded in those situations.

Mr. DEFAZIO. Anything that you can provide on that—I don't know that it is particularly material for this panel, but for the hearings that I am going to conduct on the power administration and the Columbia River System later this year, it would be useful. Because that is the first that I have heard of those statistics. So it would be interesting.

Yes, sir?

Dr. PALMISANO. My name is John Palmisano, and there is some information that I am aware of that claims that because of poor hatchery management, a lot of the fish coming down, smolters that are not adequately provided for to make the migration down stream. These fish may be released too soon, or something, from too crowded conditions, but there is some indication that some of the fish that aren't making it are hatchery fish and not natural fish. And it could be related to the hatchery conditions.

Mr. DEFAZIO. You raise a good point, because I was thinking wild; are we talking about wild or hatchery, or both?

Dr. FRISSELL. Primarily of hatchery fish, but these are from the latest new hatcheries that are doing everything right, and these are first generation hatchery releases. It does raise questions about whether the hatcheries are appropriate, even the most state-of-the-art hatcheries. But I would have to look at the data to see how wild fish are sorted out. They may have figured out through evolution ways of getting through the gauntlet.

Mr. DEFAZIO. I am puzzled that neither you nor any of the other witnesses mentioned grazing. We focused on grazing.

Dr. WHITE. I thought I mentioned it. And I thought it was appropriate to the last issue. When I talk about grasslands, I am talking about grazing areas that need attention as watersheds. But isn't the point that you were making is that a lot of degraded habitat

is due to grazing on those upper watersheds and on Forest Service lands?

Dr. FRISSELL. Yes.

Mr. DEFAZIO. We are talking Forest Service grazing versus just timber practices.

Dr. WHITE. Right. And I think there was something in the paper yesterday about the Forest Service reneging on its promise.

Mr. DEFAZIO. I questioned Mr. Leonard earlier on that. Perhaps you weren't here, Mr. White.

Dr. DOPPELT. Our proposal is just a west-side proposal. But we are waiting for the key mapping to be done and then we are going to extrapolate the strategy, and the job numbers, and the cost to the east side. But on the east side, for the most part, a lot of the work will be addressing the grazing issue. So that is a key issue with both riparian areas and the water-right issues on the east side.

Mr. DEFAZIO. In my discussions with the Secretary of Interior in his grazing reform package, the idea is there would be an increase of fees and part of it will be dedicated to a mitigation strategy. This is an important distinction because we all think timber when we say Forest Service. And if you could, wherever we can make the changes within Forest Service lands, obviously, grazing permits are allowed. And whatever part of the problem that is, it is useful to make the distinction between timber harvest and grazing practices.

Dr. FRISSELL. One of the reasons that I hesitate to do that is that they are often closely intertwined and these activities tend to occur as these areas are entered and are available to the grazers. So it is difficult to sort those things out.

Mr. DEFAZIO. I would just ask of anyone, there was a comment someone talked about, I think it was commenting on new forestry and having a zero level of risk so that we couldn't risk some areas with new forestry. And everyone has a different idea of new forestry, what the practices mean, but I can't remember who that was who was making that comment; was that you?

Okay.

Did you follow or monitor anyone who did the harvest activities that took place after the fire at the Siskyou Forest.

Dr. FRISSELL. I haven't closely followed that, no.

Mr. DEFAZIO. What we were told by the management agency, since I took part in the salvage process, was that they found no measurable impact above that that was expected, you know, after the event, with those activities, and there were no major slides or anything.

I am just curious; there is a point at which, you know—Congress is going to have to craft the balance here, and everybody would like us to say, well, I mean you get to the ultimate point where we don't do anything anyway and that is not going to happen.

When we are making judgment calls, it is useful to have discriminatory information in those areas since I understand in the best of all possible worlds there would be no activities in any of these areas, but that is not likely to happen anywhere.

Dr. FRISSELL. I am glad you asked the question, because it raises the time point question. There is no way to tell within five or ten years after an extensive timber harvest whether it is going to lead

to long-term effects or not. It may be quite a few years before the areas that are cut are vulnerable to decay. And then once that happens, it is often a matter of a decade or more before those affect numbers, the headwaters work their way down to the fish-bearing streams. It can be misleading to look at the first years after an operation and use that to decide whether it has been successful in protecting the environment or not. And of course——

Mr. DEFAZIO. And if you were only removing the trees that were already dead, you would ultimately get the same effect—perhaps, in the tree fall it provides an impediment on erosion, but not to slope loss or erosion?

Dr. FRISSELL. Clearly, you are talking about degrees of effect and by taking fewer trees, you reduce the impact and you may change the kinds of impacts that you get. I think it is more of what level you are willing to accept as far as risk in those areas.

Dr. ICE. I would like to make a comment on the conditions that you are describing. This is what is sort of called conditioning, where there is a particular hazard associated with it, and you develop a management strategy to address that risk. You are looking at harvesting of those dead trees using a helicopter system, so you are conditioning your system to address a particular condition. You have minimized the risk, and I would say that the additional risk associated with that level of activity is certainly quite low.

Mr. DEFAZIO. Mr. Higgins.

Mr. HIGGINS. I thought Chris was saying that we shouldn't be experimenting with forestry in the areas that are last bastions of fish. I think we shouldn't be experimenting in the keystone habitats.

Mr. DEFAZIO. That is a different point. It is good to make that distinction if we are talking primarily about roadless areas, but I took it as more sort of a global statement regarding forestry practices.

Dr. FRISSELL. No, I clearly meant that in the context of the critical watershed areas.

Mr. DEFAZIO. That goes far beyond roadless areas if you look at all 137. And there are differing levels of risk. When you say critical, I think of the 137.

Now, you probably mean some part of 137 is critical. It depends on what definition we are using for "critical." Among those critical watersheds, many of those are previously harvested managed areas and on differing Forest Service and BLM; mostly Forest Service.

Just in terms of legislating—and I will direct it first to Mr. Doppelt, and anybody else can jump in after he responds—I guess, first, you know, why don't we need to legislate versus the process, you know, the agencies are going through in terms of planning? But if you could discuss now how prescriptive these things should be and whether or not that is the right direction to go.

One of the later witnesses made a point that each watershed is unique. And the problem with Congress getting prescriptive is it is difficult to say we have a bill and there is 111 watersheds, and we are going to have 137 different provisions of law, and precriptions for 111 different watersheds, versus giving some sort of interpretive authority to apply some standards to the agencies. I would pose it that if you look at the southern parts of the range, we are

talking about roads may be a bigger problem, and in the northern part of the range, it may be in stream problems or riparian habitat problems. So it would be hard to write a prescription.

So I am cautious of anything. I have gone down the road of trying to get prescriptive of solving some of these problems, and I don't know that the Congress is capable, or any law is capable of getting prescriptive enough. So I would ask to you comment on those two points.

Dr. DOPPELT. Mr. DeFazio, there are two issues there that I will talk about, but I think there are at least seven or eight reasons why legislation is needed, from our point of view, rather than to allow the agencies to do this administratively, and they interrelate with the second question you asked. The first reason is that it is clear that we need uniform, consistent standards that lead to uniform rules and regulations for the protection and restoration of riparian areas for the definition of a key watersheds, what is allowed in a key watershed.

We have had recent meeting with the BLM and the Forest Service, where it was clear that even to the same river system they still don't know what they are doing between the Forest Service and BLM. So we may run up into a situation where they do this administratively and where the BLM deals with riparian areas on the same rivers different than the Forest Service. So one, we need clear, consistent prescriptions, but at the same time, we need to make sure that the clarity gets all the way down to the local management level.

At best, despite almost 15, 20 years of NEPA, now with the mandate to establish rules and regulations for the protection of riparian areas, the Forest Service has still not done this. At best, they have guidelines which are not a legally binding statement——

Mr. DEFAZIO. Let me give an example to help clarify your thinking on that.

When we look at the "Gang of Four" prescriptions and riparian areas, when you adopt a mandatory setback for a no harvest or very limited entry sort of system, it doesn't take into account topography, because you may have gone over a ridge and have absolutely no impact. That is one very practical comment. If the Congress says a mile or quarter of a mile; how do you deal with that?

Dr. DOPPELT. I think the question is what kind of prescriptions, and what we put in our proposal, that it be ecologically determined and, therefore, they need to go out into each watershed and measure the 100-year flood plains level. So I think the prescriptions need to state unequivocally that it is not arbitrary zones, so to speak, but, in fact, it is ecologically determined. There is a couple of other things——

Mr. DEFAZIO. One more. If you recall, maybe, one of my first efforts at legislation to resolve this ongoing crisis in the Northwest did adopt that approach and perhaps not your group but other groups were extraordinarily derogative as to not adopting arbitrary distance as opposed to a ecological measurement, because they didn't trust the agencies to make ecological measurements. You are putting us in a box.

I am looking for the answers, and I am trying to be helpful. But in proposing something I get trashed a year ago and now it looks

good; is that because we have a different administration and we trust them more?

Dr. DOPPELT. We would trust that it is part of a piece of legislation that sets a new, clear direction. That is the missing link. To be candid, Mr. DeFazio, there were other issues that got cumulated.

Mr. DEFAZIO. That was one thing I heard. I heard that.

Dr. DOPPELT. We also need interagency planning, consistent planning and assessments within the same watershed. That is going to require legislation, I think, to create. We are going to have to establish some very clear priorities for the agencies to determine whether they put their dollars in the resources. If we allow each district ranger to make changes, we will not get the best protection to the remaining areas. We need budget structure to provide funding for this process that is going to require an act of Congress.

And finally, we are going to need a restructure and a new infrastructure within the agency to create the planning and the treatments necessary. At this point in time, if we gave the agencies $165 million, and say go down and storm proof it, they wouldn't know what to do with that.

They need a new direction. We are extremely dubious that this will ever happen effectively administratively.

Mr. DEFAZIO. I understand your concerns. But somehow there is a line to be walked between the Congress attempting to do the day-by-day management and putting some faith and trust, and giving a charge to the agencies to come up with some measurable results. And perhaps it comes through monitoring or something along those lines.

One other point, if you will address this, and then I will allow other panelists to speak. You put emphasis on the interagency part, and I agree with that. But how do we begin. I am not as sanguine as Dr. Ice on the private land practices because I think that part of what is reflected in all the testimony I have heard on this issue over time, is a very conservative viewpoint on the part of the people representing your viewpoint on these issues. But part of the conservatism is based not necessarily on an assumption quite as radical as the one Mr. Higgins offered—that we assume basically clear-cutting everything on the private lands—but the point that we are going further on Federal lands because of concern about downstream impacts and further losses. I have struggled with this. You are recommending Clean Water Act enhancement. The administration seems very interested in market-based incentives to deal with some environmental issues. And if you have any thoughts, now or at a future date, of incentives that could be offered to adjacent downstream or critical private landowners from the Federal Government in order to get those sorts of enhanced management activities, or to compensate them for losses that they would incur over and above what is required by existing State laws to practice on those lands. Mr. Higgins?

Dr. DOPPELT. I would like to respond to that.

I would agree that we must first realize that private landowners are acting rationally, at this point in time, in the way that they treat their lands, in that all the direction that they are getting from their government at the Federal, State and local level is to

degrade as quickly as possible. That is the message that we give as a society through the kinds of taxes we provide, the kinds of incentives and policies that we have. So I don't think anything is going to change.

You are absolutely correct, until Federal leadership is given a new set of incentives and direction that, in fact, begins to change behaviors. We have a group of folks who have been working on private land strategies, national watershed register strategy, we bring them into a watershed restoration program through a set of incentives to prioritize grants from Federal programs for the creation and implementation of a restoration plan to provide technical assistance, as we have tried to do in our proposal, to make sure that we keep the economic benefits of restoration locally tailored. Not only keep the jobs in restoration local, but also the benefits of converting agriculture crops to less water and energy-intensive crops. To be sure that accrues to the private landowner. He will use less electricity to pump the water, and they may be able to create more income from different crops while we leave more water in the stream.

Those are things that are occurring across the country, and we need a set of Federal incentives to catalyze them into a comprehensive effort in the Northwest and elsewhere.

I will go back and say that the other issue here is how long it will take the administration to apply new policies; if they even get that far. Time is of the essence to stormproof these watersheds to eliminate these things. If we go through the full administrative process, it could be two to three years. We would like to see this happen quicker, although we know sometimes it takes Congress a while, too.

Mr. DEFAZIO. Now wait a minute, we are not recommending that we short circuit the NEPA or the other process, are we?

Mr. DOPPELT. No, but Congress can state that this is the law of the land and that would short circuit a long, drawn out planning process that we may not have time for.

Mr. HIGGINS. I will defer to my colleagues on the panel on this question.

Mr. PALMISANO. Quickly, I wanted to summarize that we found that there was a multitude of factors that cause problems, and we don't want to point fingers or spread blame, but if we do all of this rehabilitation in the freshwater habitat it is important to know that estuaries are just as important. And if there is no work in those estuaries, we will have a surplus of fish upstream, and any approach we take has to be a balanced approach. And along those lines people have mentioned that we have to keep fishing going, because fish translate into jobs. Well, to be fair, timber also translates into jobs, too.

And again, since everyone was part of the problem, everyone has to be a part of the solution. It would be very unfair to blame everything on the dams or everything on the fishermen. Whatever implementation we have to come up with, those have to reflect the life history of the fish and be spread across the spectrum of users, not just one group.

Mr. CASSIDY. I just wanted to stress that there is a chance here to seize upon change, and for the Forest Service to implement

plans that are quantitatively based, that do have quantitative measures, so that they can have a very real assessment of what effects management in the watershed have on the aquatic habitats. That is something that the new Secretary can make a strong pitch on and the Congress can demand accountability on the ground.

I think there is a growing urge for that inside of the agency. And it is simply a matter of articulating the national significance of that by the administration, with the support of the Congress. That would help to get us there.

Bob has identified some very important elements of the legislative strategy, but there is a lot that the Federal land managers can do at the same time that is being developed.

Mr. DEFAZIO. Okay.

Dr. Ice.

Dr. ICE. I would like to comment on the discussion with private companies having an incentive to degrade stream systems.

Mr. DEFAZIO. We ought to conduct these as planned debates in the future. You are giving me interesting ideas here.

Go ahead.

Dr. ICE. Excellent examples of attempts of the industry to cooperate in the fisheries program that was jointly signed between the Oregon Forest Industry Council, the Oregon Department of Forest, and the Oregon Department of Fish and Wildlife, where landowners sit down with the Oregon Fish and Wildlife at the beginning of the year and show where they are going to be operating. They are operating their equipment and manpower and resources, including logs and rocks, to provide stream enhancement activities. And 100 projects have been put in place as a result of those efforts, and those will be continuing each year.

So it is a demonstration that the industry has a commitment to work to try to solve these problems. Every company that I know of is concerned about their environmental image. They want to be recognized as being environmentally friendly. And part of that is forest management operations, and they are determined to have good practices.

Mr. DEFAZIO. Dr. White.

Dr. WHITE. Accountability was mentioned, and part of that is monitoring and evaluating what is done. You cannot do that on every project or it will double or triple the projects.

What Dr. Ice is talking about here, you know, is sticks and stones put in the creek. I'd pose the question: How much good has it done? That needs to be evaluated.

I hope that is happening and that is what should be pressed for in this legislation, if it takes place, is money earmarked for that that cannot be taken out and given to something else.

Mr. DEFAZIO. Okay.

Mr. Higgins.

Mr. HIGGINS. I think it is difficult to get private timber, at least where I live, to cooperate in a program, because right now their activities are virtually unregulated. They are writing their own rules in California. They control the courts in California, the Department of Forestry and their Grouse Creek, Six Rivers Forest has looked at Grouse Creek because of cumulative effects, and the California Department of Forestry has yet to turn down a timber harvest

practice request from private companies there. They are trying to reduce the cumulative effects so that they can get back in national forest timbers that is at public expense. But it is difficult until we have direct enforcement to get cooperation from private timbers because it is so lucrative just to go in there and get it.

That is what is going on in California right now. We missed a public initiative process to reform California forest practices rules by 52 to 48, and I thought that the private timber industry would take that as a bellwether, change their forest practice and come to the table and discuss the rules that they can live with, but they are liquidating. Dr. Ice and I have a fundamental difference here. South Fork Mountain, we have studies after the 1964 flood, it said cut out on the ridges. And instead we have massive clear-cuts on private lands on soils that are like ice cream. How do you get the beneficial use for a creek that is underground because of a 1964 sediment plug, from 30 percent of the basin being logged? And today it is 80 to 90 percent logged. And the land was provided to the private forestry and liquidated.

Mr. DEFAZIO. All right.

I appreciate the testimony and, you know, this will be, hopefully, a part of the comprehensive legislation that will, forever, and with great wisdom, divide the baby or make the baby whole, but make everybody happy in the Northwest. I don't know.

Let us tune in later and we will be talking to you all.

Thanks very much.

[Whereupon, at 3:08 p.m., the subcommittee was adjourned.]

APPENDIX

MARCH 11, 1993

ADDITIONAL MATERIAL SUBMITTED FOR THE HEARING RECORD

John F. Palmisano, Ph.D. • Bio. Consultant • 503/645-5676 • 1990 N.W. 156th Ave. • Beaverton, OR 97006

March 16, 1993

The Honorable Bruce F. Vento, Chairman
Subcommittee on National Parks, Forest, and Public Lands
United States Congress
House of Representatives
2304 Rayburn House Office Building
Washington, D.C. 20515

RE: Corrections and Additions to the Oversight Hearing of March 11, 1993

Dear Chairman Vento:

I am writing to request that the following corrections and additions be made to the record of the March 11, 1993, Oversight Hearing on Watershed and Fish Habitat Degradation on Public Lands and National Forests in the Pacific Northwest.

My affiliation was incorrectly stated on the Witness List. For the record, I am Dr. John F. Palmisano, an independent fisheries scientist from Portland, Oregon. I am not affiliated with Oregon State University.

Mr. Thane Tiensen of Salmon for All from Portland, Oregon, misrepresented my position on marine mammal-salmon interactions. Contrary to what he stated or implied, I do not believe that marine mammals, such as seals and sea lions, are solely responsible for the current decline of salmon in the Pacific Northwest. On the contrary, salmon have coevolved with marine mammals, never completely succumbing to these predators or avoiding them. Instead, harbor seal and California sea lion populations have been increasing by 4 to 12 percent per year since the Marine Mammal Protection Act of 1972. Thus, current seal and sea lion predation has a more significant impact on salmon than in the past because salmon populations have been declining while marine mammal populations have been increasing. It is simply a matter of arithmetic; larger numbers of predators and smaller numbers of prey increase the current impacts of predation.

I attempted to present a fair and balanced description of the factors that have caused salmon populations to decline in the Pacific Northwest. While I acknowledged that a multitude of factors, including forestry, contributed to the decline of salmon, Mr. Tiensen refuses to acknowledge that overfishing contributed to these declines. Regardless of what has caused these fish to decline, each year insufficient numbers of mature fish escape the fishery to spawn. In Washington State, only 41 percent (46 of 113 runs) of salmon and steelhead trout stocks meet agency established annual spawning escapement goals (see Exhibit 1). In addition, annual total harvest rates are excessive. Optimum harvest rates for Northwest salmon should be between 40 and 70 percent. Instead, several salmon runs have annual harvest rates of 80 and 90 percent and higher (see Exhibit 2).

March 16, 1993
Chairman Vento
Page Two

THE ASSURANCE OF COMPLETE COMPLIANCE WITH ESTABLISHED ANNUAL SPAWNING ESCAPEMENT GOALS AND LIMITING TOTAL ANNUAL HARVEST TO 70 PERCENT OR LESS IS THE CLOSEST THING THERE IS TO A "SILVER BULLET" FOR THE DECLINING POPULATIONS OF PACIFIC NORTHWEST SALMON.

In addition, selective fishing gear has routinely reduced body size of commercially caught salmon, for example by almost 23 percent in Washington since 1935 (see Exhibit 3). Because egg number is related to the size of mature female fish, reduced body size can lead to reduced fish abundance even if the population size remained constant over time. (These Exhibits are from written testimony I presented to the Subcommittee on Wednesday, March 10, 1993.)

For the maximum benefit to salmon production, restore lost flood plain riverine and estuary habitats. I am compelled to remind the members of the Subcommittee that improvements to freshwater habitats will not result in increased salmon abundance unless commensurate improvements are made to lost and degraded estuarine habitat. Estuaries provide critical physiological transition areas, food, and refuge from predation for several species of Pacific Northwest anadromous salmon and trout. Simply stated, restoration projects should be balanced. Existing estuarine habitat will serve as a "bottleneck" to salmon production if planned improvements occur in upriver and not in estuarine habitat.

Finally, certain statements made by Mr. Pat Higgins of Humboldt, California, were misleading, false, and irresponsible. Mr. Higgins' statements that the state of California has no Forest Practice's Acts is untrue and a blatant misrepresentation of fact. California, along with Oregon and Washington have some of the most stringent Forest Practice's Acts in the United States. To balance the needs of the timber and fishing industries, and accordingly to assure continued production of wood products and protection of our salmon resources, state and federal agencies should make every effort to update and enforce these acts.

Again, thank you for the opportunity to address the Subcommittee and to present corrections and additions to the record. If I could be of further assistance please do not hesitate to ask.

Respectfully,

John F. Palmisano

John F. Palmisano, Ph.D.
Fisheries Scientist

cc: Charles H. Burley, Portland, OR.
Northwest Forest Resource Council

Mark E. Ray, Washington, D.C.
American Forest & Paper Association

EXHIBIT 1

Percentages (and Numbers) of Wild Salmonid Runs, by Species and Major Washington Fishery Areas, That Were in Compliance with Established Spawning Escapement Goals in the Last Year of Record (i.e., 1985-89, 1990, or 1991)

Species	Coast	Puget Sound*	Columbia River	Total
Pink	- -	56% (5/9)	- -	56% (5/9)
Chinook	89% (8/9)	29% (4/14)	50% (2/4)	52% (14/27)
Chum	- -	45% (13/29)	- -	45% (13/29)
Sockeye	- -	0% (0/2)	100% (1/1)	33% (1/3)
Coho	80% (4/5)	8% (2/25)	- -	20% (6/30)
Total salmon	86% (12/14)	30% (24/79)	60% (3/5)	40% (39/98)
Steelhead	80% (4/5)	25% (2/8)	50% (1/2)	47% (7/15)
Total salmonids	84% (16/19)	30% (26/87)	57% (4/7)	41% (46/113)

*Includes Strait of Juan de Fuca.

EXHIBIT 2

OPTIMUM HARVEST GOALS FOR WILD SALMONIDS: 40 TO 75%

Washington Stocks	Recent Harvest Rates Ocean	Terminal	Total
Coastal Chinook	48%	34%	65%
Coastal Coho	51%	44%	71%
Puget Sound Chinook	71%	61%	87%
Puget Sound Coho	62%	72%	92%
Puget Sound Pink	—	37%	(37%)
Puget Sound Chum	—	70%	(70%)
Total Steelhead	—	69%	(69%)

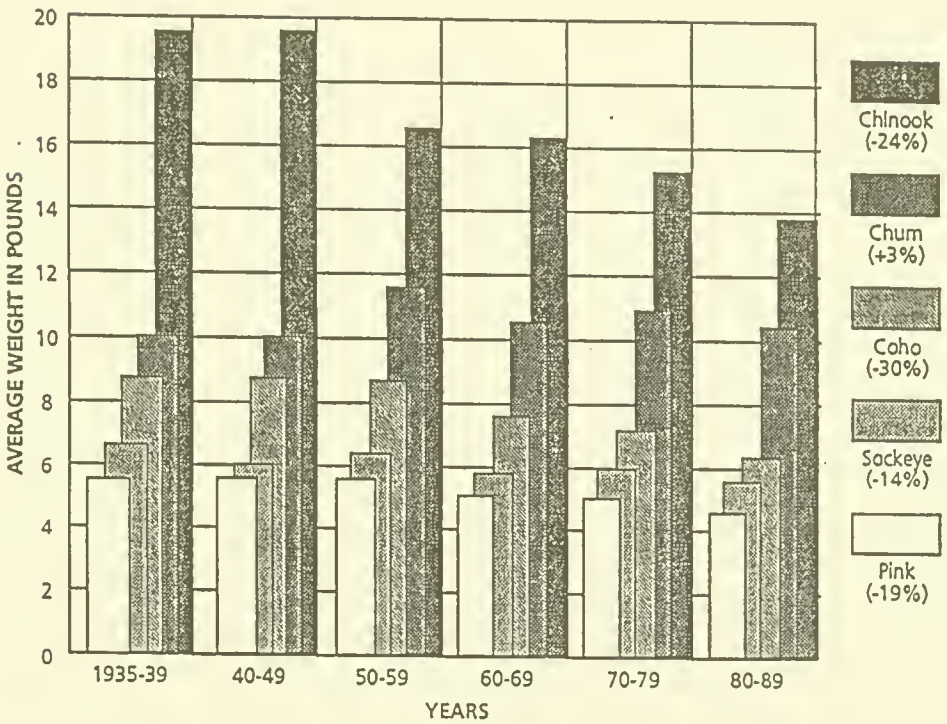
Columbia River Stocks	Recent Harvest Rates Canada	Ocean US	Total	Columbia River	Total Harvest
Lower River Fall Chinook	33%	61%	79%	32%	87%
Upper River Fall Chinook	32%	61%	80%	50%	93%
Coho	6%	56%	64%	55%	89%

Note:

Harvest rates across columns are not additive; the rates depict the percentage of total available fish per stock harvested at each fishery location

EXHIBIT 3

REDUCED BODY SIZE OF SALMON COMMERCIALLY CAUGHT IN WASHINGTON



Measured Average Weight (in pounds) and Percent Change of five species of Pacific Salmon Commercially Caught in Washington* between 1935 and 1989

Time Period	Coho	Chinook	Pink	Sockeye	Chum	Total
1935-39	8.8	19.7	5.7	6.6	10.0	8.4
1940s	8.8	19.7	5.8	6.0	10.0	8.1
1950s	8.6	16.4	5.8	6.3	11.7	7.8
1960s	7.8	16.3	5.3	5.8	10.5	7.4
1970s	7.2	15.3	5.3	6.0	10.9	7.5
1980s	6.2	14.9	4.7	5.7	10.3	6.5
1935-1989 Change	-29.5%	-24.4%	-19.0%	-13.6%	+2.9%	-22.6%

*Coast, Puget Sound, and Columbia River

Source: WDF, 1991.

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